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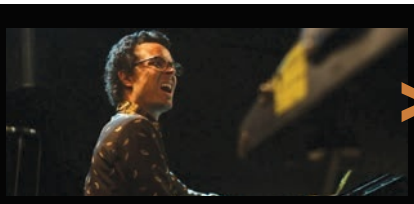
THE CRYSTAL METHOD

HOW THEY FACE DOWN THE BLANK SESSION SCREEN



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> ON CREATING YOUR OWN MUSIC THEORY

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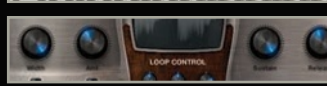

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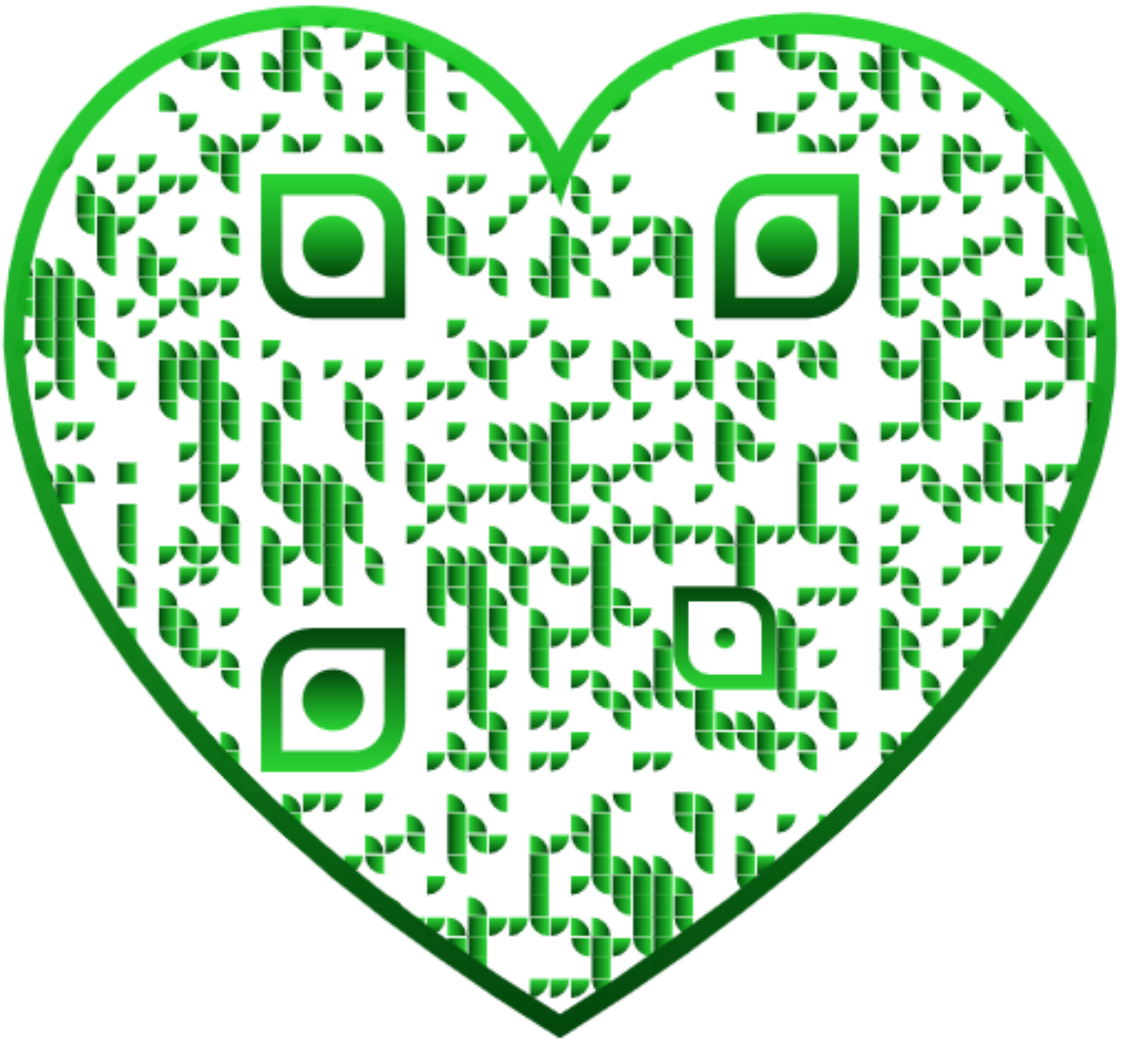

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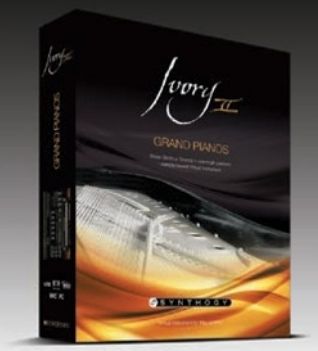

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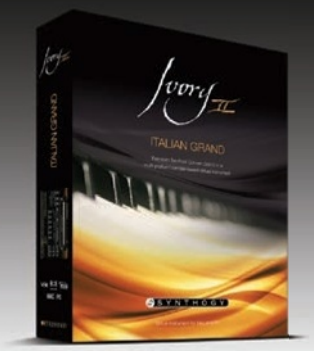

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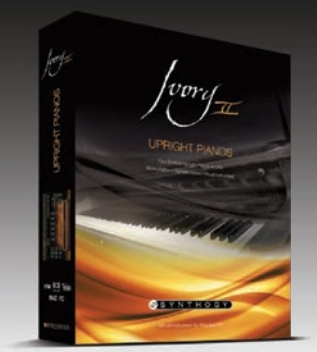

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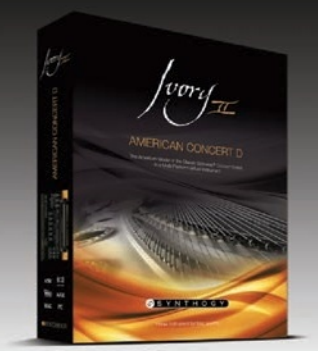

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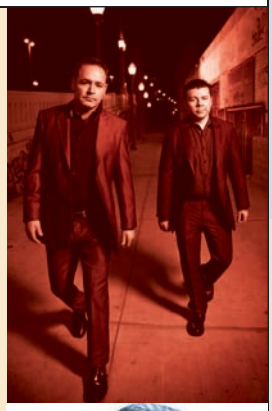

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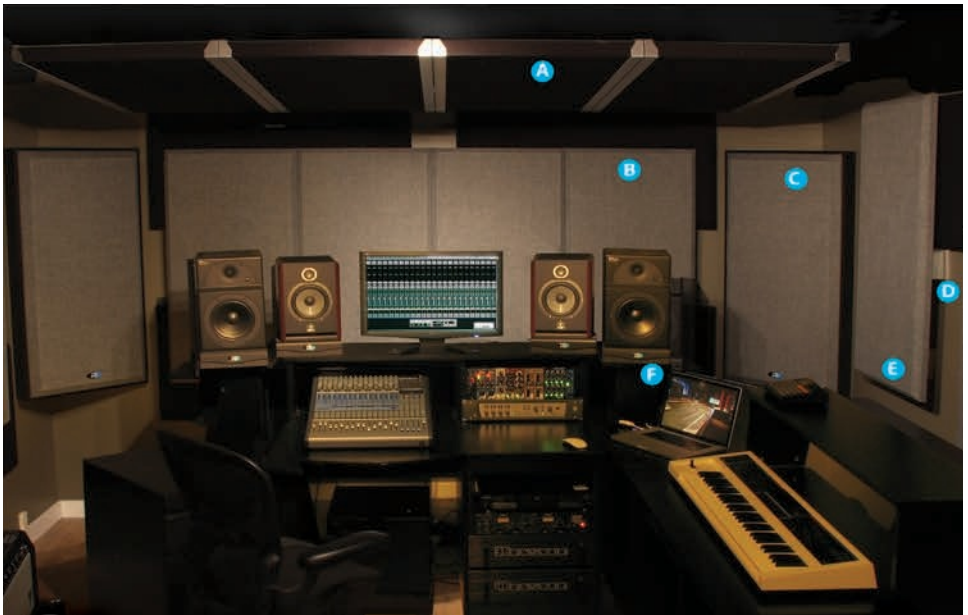

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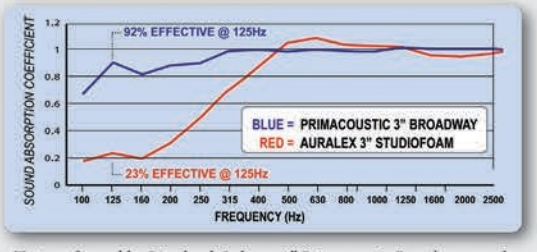

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EDITORIAL DIRECTOR: Michael Molenda mmolenda@nbmedia.com
EDITOR IN CHIEF: Stephen Fortner sfortner@nbmedia.com
MANAGING EDITOR: Debbie Greenberg dgreenberg@nbmedia.com
EDITOR AT LARGE: Jon Regen
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EDITORIAL ASSISTANT: Grace Larkin
ART DIRECTOR: Damien Castaneda dcastaneda@nbmedia.com
MUSIC COPYIST: Matt Beck
PRODUCTION MANAGER: Amy Santana
PUBLISHER: Joe Perry jperry@nbmedia.com, 212.378.0464
ADVERTISING DIRECTOR, EASTERN REGION, MIDWEST & EUROPE: Jeff Donnenwerth jdonnenwerth@nbmedia.com, 770.643.1425
ADVERTISING DIRECTOR, WESTERN REGION & ASIA: Mari Deetz mdeetz@nbmedia.com, 650.238.0344
ADVERTISING SALES, EASTERN ACCOUNTS: Anna Blumenthal ablumenthal@nbmedia.com, 646.723.5404
SPECIALTY SALES ADVERTISING, WEST: Michelle Eigan meigan@nbmedia.com, 650.238.0325
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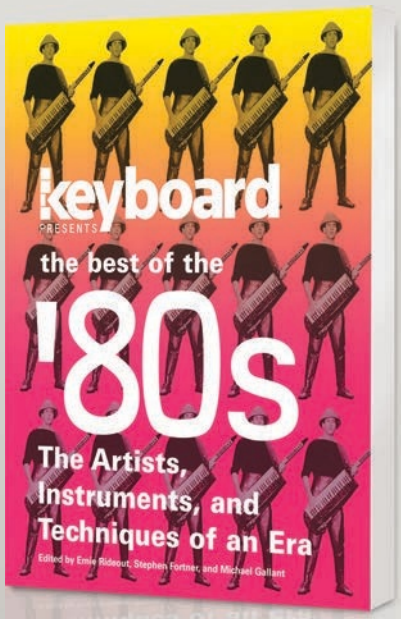

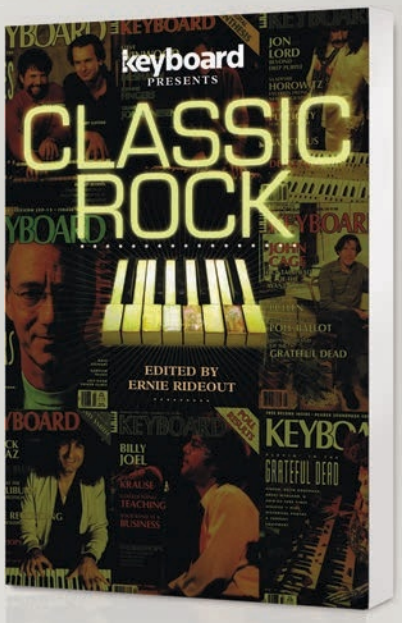

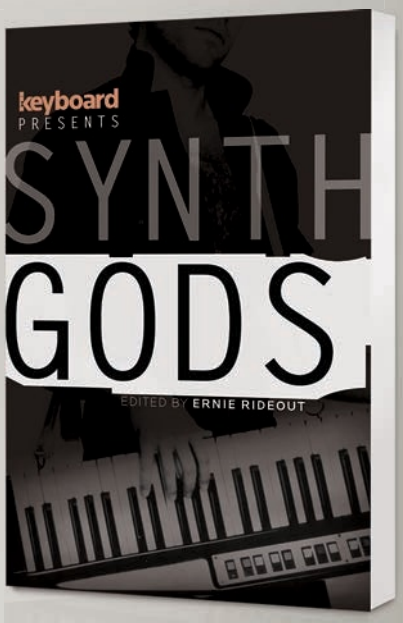

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SYNTH GODS

Culled from the pages of *Keyboard* magazine, this book spotlights artists who did much more than just play synthesizers: they changed the course of music history and inspired generations. Featuring in-depth profiles of Jan Hammer, Wendy Carlos, Rick Wakeman, Brian Eno, and others, this book delves into how these new, untested boxes of circuitry captured the imagination of so many legendary artists.

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Editor's Note

Last month in this space, I recalled the moment when I knew I wanted to be a multi-keyboard-playing synthesizer geek and asked you to do the same. One of the most inspiring responses came from reader Karl Whetzel, via Facebook:

"As a young kid in the early '80s, I'd studied piano a bit like most others my age, but I didn't have a deep passion for it," Karl writes. "However, when I happened to check out a record from the library, that all changed. That record was Wendy Carlos' *Switched-On Bach*, and it awakened an awareness that keyboards and synthesizers could sound like so much more than a piano or organ. I must have spun that record hundreds of times, fascinated by the electronic sounds. I have fond memories of that time when the world of synths was so new and exciting, visiting the local music store to drool over the synths I hoped one day to own, and seeking out as many albums as I could find that had synthesizers on them. Not to mention discovering *Keyboard*, a magazine dedicated to this world!"

Bravo, Karl. The name of the record may change, but keyboard players and electronic music enthusiasts of all generations share your exact experience. As I write this I'm getting ready to cover the NAMM show, which always reminds me that the world of synths and keyboards never ceases to be new and exciting.

Stephen Fortner
Editor

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Key Secrets Switch It Up

For a quick shot of inspiration, try playing parts on an unexpected instrument or patch. For example, create a drum track by overdubbing short blips from an analog monosynth. Then add pulsating chords by sending a snare backbeat through a vocoder or resonator, a bass line with a radically transposed flute, and a melody made by sampling an annoying sound such as a smoke alarm. Switching it up is a great way to listen with new ears. Producer Jimmy Jam told me that accidentally changing the sound chips in a LinnDrum (see the video at keyboardmag.com/march2014) inspired him to write Human League's "Human," which spent seven weeks at Number One. David Battino

THE Keyboard POLL

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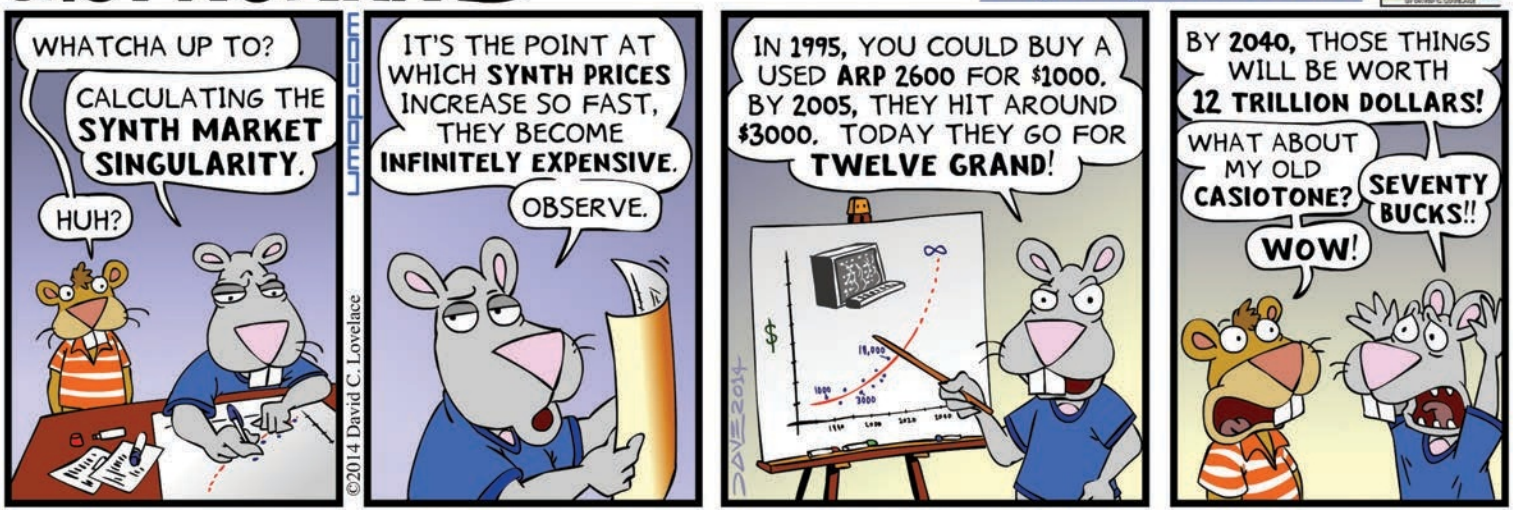

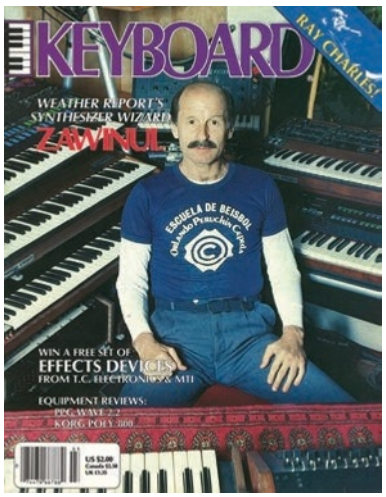

+ 30 YEARS AGO TODAY

Josef Zawinul appeared on our March 1984 cover with a dream rig that included (clockwise from bottom left) a Swanson controller keyboard for his Oberheim Eight-Voice, Prophet-5, ARP Quadra, Korg Vocoder, another Prophet-5, and a Rhodes Chroma. A whopping two gear reviews encompassed the $8,800 PPG Wave 2.2 and the more approachable Korg Poly-800, which listed for $795. Guess which one our current editor (then much younger and slightly more broke) bought that coming summer?

NEXT TECH »RETURN OF THE TR-808?

Press time for this issue fell just ahead of NAMM, which is when Roland started teasing us with a video of the Aira drum machine, in which they invoke the legacy of the legendary TR-808. Word is that more details won't be forthcoming until some time after NAMM, but we'd bet that a digital and possibly "SuperNatural" heart beats underneath its TR-style interface. What we find out, we'll put on our website—likely before the next issue hits.

My First Accordion Gig, Charlie Giordano

"When I was growing up in Brooklyn in the 1960s, lots of kids played the accordion," says keyboard master Charlie Giordano, who lays down squeezebox, B-3, piano, and synths on the road with Bruce Springsteen. "But I was a piano kid. I came to accordion later in life." During a mid-tour barbeque two decades later, it was guitarist Marc Ribot who recommended that Giordano study accordion with Bill Schimmel, who played the instrument on the road with Tom Waits. The idea stuck and Giordano's first professional gig on the instrument came a year later. "I was nervous and got teased about bringing six accordions to record a 30-second Zydeco jingle date," Giordano says, laughing. "I wasn't really worried about musicality during the session, since I tried to apply everything that I'd learned up to that point in music to what I was doing with the accordion. I was just nervous about being able to execute what I needed to play!" Giordano aced the session and that date led to quite a bit of subsequent work—and eventually, his gig jamming with the Boss. "I was subbing in a band that Soozie Tyrell was subbing in as well," Giordano describes. "The band got invited to one of Bruce's birthday parties and he got up and played with us. That led to the whole *Seeger Sessions* album." For more, visit brucespringsteen.net/the-band/charles-giordano. | Michael Gallant

NEW GEAR

BY GINO ROBAIR

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THE CRYSTAL METHOD

BY DAVID BRYCE

KEN JORDAN AND SCOTT KIRKLAND AREN'T JUST LEGENDS OF ELECTRONIC DANCE MUSIC— they were instrumental in pioneering and defining it. Having been producing records and performing live together for 20 years since they first joined forces in Las Vegas, they also have their fingers in over 50 film scores including *Blade: Trinity*, *Spawn*, *Tropic Thunder*, and *Fast & Furious 6*, not to mention TV soundtracks such as *Third Watch*, *Bones*, *Real Steel*, and the new J. J. Abrams android-cop drama *Almost Human*. Just a few of their video game scores include *Need For Speed: Nitro*, *FIFA* '97 and '98, and *League of Legends*.

We got a chance to visit their Crystalwerks studio in North Hollywood for an extended conversation, in which they schooled us on the techniques and gear behind their fifth studio album, self-titled *The Crystal Method*. It features collaborations with such diverse artists as Dia Frampton, Afrobeta, Nick Thayer, and even country music icon LeAnn Rimes.

Let's start with your approach to "Grace," the tune you worked on with LeAnn Rimes.

Ken Jordan: Our tendency is to go "big maximum" on everything, but on that track we wanted her voice to really shine.

Scott Kirkland: We had a skeleton track that was much different from anything that we'd ever done. It had a sort of faux electric piano vibe and a very laid-back beat. Did you see the *Re:Generation* documentary? That movie is based on different producers working in different genres that they may not be comfortable with, like Skrillex working with members of the Doors, or Pretty Lights working with Ralph Stanley, a bluegrass artist.

So there's a moment where LeAnn is working with Derek from Pretty Lights. He's trying to go for this very throwback, trip-hoppy vibe—very natural and organic but DJ Shadow-like, with lots of warmth, lots of reverb, lots of really great funk elements. But he was doing country, this sort of re-creation of a song that you would maybe find on an old 45 or even an old 78-speed record.

There was this moment on the documentary where they're in the studio and he's got LeAnn in the iso booth and he's in the control room, and he goes, "Try this part," and she does this whole part that's only her singing a cappella, and it's just spectacular. And he goes, "That's great. Can you try it an octave up?" So she goes an octave up, and it's even better and you're just like, wow! If you take away the instrumentation around a great vocalist and you just hear their voice, you can imagine it in so many different things. You discover the beauty and flexibility of a gifted vocalist.

If you didn't know she was a country artist, you'd never guess from listening to that track. What motivated you to take this approach?

KJ: When we first met her, we were telling her about one of our favorite tracks from the beginning rave days that the KLF did with Tammy Wynette. They used her voice in this really cool way. It was a minor mainstream pop hit way back then.

SK: It was in '91. [*Plays KLF music video, "Justified and Ancient."*] You hear that track, and you realize somebody had a guitar, somebody had a banjo, but when you break out the vocalists on their own you can really get some amazing stuff.

Working with so many different singers, how did you take best advantage of each one's voice while still maintaining your own coherent sound?

KJ: Our formula has always been no formula [*laughs*].

SK: For example, we'd met Dia Frampton during the release of the *Re:Generation* documentary, and she's talking about how people *think* they know what she listens to, but in fact she likes hip-hop and a lot of different things. And that does happen. I mean, I can't tell you how many times people are surprised by things like that. Overcoming it can be difficult because a lot of people only want to hear you do one particular thing. But on our first record, having just been schooled by KLF and Tammy Wynette and John Lydon and Left Field, the A-side had a track that was 127bpm and the B-side had a dubby, downtempo thing that was experimenting with a different side of us. Point being, experimenting can be a lot of fun. Sometimes it doesn't work. On the last record it didn't work because we didn't get a chance to work with the people directly. Usually, somebody recorded the vocal separately. . . .

So, you tracked all the vocal collaborations on the new record at Crystalwerks, then?

KJ: Exactly. For the new album, we stipulated that all tracks had to be recorded and sung in our studio.

SK: With Dia and LeAnn, it was that whole interaction of "we should try this or that" or "move this over here"—the whole thing that happens in the room organically.

KJ: This album was kind of going back to how we made the songs on our album *Vegas*—using the best of all the new technology but also writing the way we used to. Fifteen years or more ago, it wasn't even a concept that somebody could record some parts at one facility and some at a different one. But even though you *can* do it now, that doesn't necessarily make it any better. I think everything being done here makes it better.

So, was there any remote collaboration on the new record at all?

SK: Nick Thayer approached us. He's a great guy—we'd met him at Burning Man and are big fans of his work. We talked a bit and decided we wanted to do something that was like the "*bam bam bam*" songs, the "guttural" songs we're known for. Based on that, he sculpted this beautiful sound at his place, and we took it back and built everything for the track we call "Dosimeter" around it. So that was one part that *was* outside of our studio, but he understood what we were doing. We made a track that was really the best of both worlds.

Is there any one keyboard to which you typically turn to get the work process started?

SK: We have a few faves, to be sure, but it really varies from tune to tune. I remember a period where we had a "keyboard of the day" thing going on—we'd try to bring in a different analog synth even if we hadn't used it in awhile, plug things in, get our old pedals out, and so on. When someone like Nick Thayer comes over to the studio, he knows all the soft synths better than we do. He's really great at working in the confines of the box, within the computer. So we could get a really nasty sound out of Massive or Absynth or whatever . . . but this was usually about getting some unruly nonsense that we typically don't expect to get out of hardware synths.

KJ: With hardware, it's also about the instrument itself. For example, our ARP 2600 has filters that are set up [with sliders] on the front—so your hands can do these things that you wouldn't do with a knobby synth like our Alesis Andromeda. Then, sending it through the Sherman Filter Bank produces sounds that are unruly as all hell. So, then,

5 SYNTHS THE CRYSTAL METHOD CAN'T LIVE WITHOUT

ALESIS ANDROMEDA A6
Ken: "We love it—we have two!"

MOOG MEMORYMOOG PLUS
Ken: "This one turns up a lot, too."

ROLAND MKS-80 SUPER JUPITER
Scott: "I was tempted to say the Jupiter-6, but we probably use the MKS-80 module more. There's this sound that you can't quite create on any other synth. The cross-mod gets into the envelope and there's a magic that happens."

ARP 2600
Scott: "This is the synth that's on our new collaboration with Dia Frampton"

CASIO XW-P1 and **XW-G1**
Ken: "We used the XW synths on the new album, and we use them to perform live."
Scott: "They sound amazing, and I love being able to communicate with the iPad app [MIDI Designer] directly from the keyboard."

once we'd decided on what we were going use, it was basically recording for ten minutes without judging anything. The goal was to simply react to what we were hearing and the relationship that we had with the instruments.

The new record doesn't sound like a bunch of loops or patterns put together in "DJ" style. It sounds like linear songwriting. Is that the case?

SK: Yes, it is. That's a result of how we first started working, years ago. We didn't even have computer-based recording. We'd record to a DAT, with a drumbeat on one stereo side and a synth on the other, and we'd record for ten minutes, and then cut things up.

How many of your grooves are derived from programming or synth patterns, as opposed to grabbing audio loops and building stuff around them?

SK: Loops are obviously easier to work with. There are sounds and loops from soul records. We've been digging through and buying a lot of those to mine for samples—loops, breaks, whatever—that we rely on a lot for inspiration and content. One thing that's most inspiring for me right now is the FXpansion [virtual instrument] called Geist. It's a drum machine that's a REX loop player, and it's an interesting tool in that you can have edit points in your loop. If you play a REX file, you'll get the expected results, but if you jam out on an analog synth for a few bars and find a really sexy spot that you like and you tell Geist to figure out how this passage is broken down, it'll sometimes come up with strange and different things. Also, lots of times, a drum loop is amazing feel-wise, but all the sounds are screwed up with clicks and noises. So you start to dissect that and put in new drum sounds, strip things down, get inspired by something that results from that process, *then* reconstruct it.

So, you do sometimes start a project out with loops and samples?

SK: Sometimes, yes. When you pull up a new session and there's nothing there, that's so daunting. There's nothing—not a tempo, not anything. So we've collected all these things, we pull up old riffs, and we mess around with different tempos or beats. You need a spot to jump *from*. Fortunately, there are very creative people out there making incredible products.

Would you say a large part of your process is creating order out of chaos?

SK: In a way. In thinking visually about the song, let's say there's one up-tempo part and one down, and one takes over and they're "antagoniz-

Ken Jordan (left) and Scott Kirkland with a few of their favorite things. *Background, clockwise from left*: Memorymoog Plus, M-Audio Axiom Pro 25, Nord Drum, and ARP 2600 controller keyboard leaning on wall; M-Audio Venom synth atop Avid Icon control surface for Pro Tools; Oxford OSCar above Moog Source. *Foreground table, clockwise from noon*: Roland Jupiter-8, ARP 2600, Arturia Spark controller, Maestro Rhythm 'N Sound guitar effects unit, Casio CZ-101, FutureRetro 777, MiniKorg 700S, MicroKorg XL, and Conn strobe tuner.

***Behind photographer, top to bottom*: Korg MS2000, Oxford OSCar, Roland Juno-106 and Jupiter-6, and Akai MPC3000. *Table, clockwise from left*: Alesis Andromeda A6; Casio XQ-G1, CZ-101, and XW-P1 synths.**

ing" one another. But you don't want it to be like *The View* where they're talking over each other. You see those clips of *The View* and it's just 30 seconds of them yelling at each other. I like the antagonism to be well orchestrated and well laid-out.

So, that sounds like you're thinking visually about the music. Can you elaborate on that?

SK: Absolutely. My perspective comes from being a kid, when the first relationship I had with music on a spiritual level was the score of *Star Wars*. The only way you could connect to *Star Wars* outside of the theater was through the score, because the movie wasn't on a videotape or a DVD. I would come home and play the score and see the artwork and the ships coming in and all the film's actions in my mind. Music should have great actions. That's my way of describing what it is we try to do. Even music that isn't a film soundtrack should do what a soundtrack does, in terms of making you imagine or recall a series of events or emotions.

Your use of tones *as* percussion—and vice-versa—is striking. How do you discover sounds that can evolve into actual musical parts?

SK: You know, we have a process that's similar to comedy writers. You see the *Daily Show* or *Late Show* workspace, and all this stuff is up on the wall, for no other reason than to be some form of inspiration. On that song "Grace" with LeAnn Rimes, for example, we exported a bunch of things, put them on a disc, and sat here for about 30 minutes recording all kinds of things with her vocal. When I DJ, I do some silly things like turning off the tempo control and pitch-shifting the beat until it's a different sound, so we also experimented with the CD deck. After about three ten-minute sessions of doing that, we found the right part, and LeAnn's vocal kind of slides into that.

I often like to have a bunch of things to look through. In 20 minutes of just utter nonsense, you might find this one thing that has the right rhythm and the right sound. It's like, "Wow, I found the seed that I can build everything around."

As a rule of thumb, do you start out with a melody or a bass line as a foundation and then build upon that, or do you jam until you capture some cool sections?

KJ: It's usually more about melodies and chord progressions. We still hear songs in the traditional way. But when there's a vocal, generally the process is different. It just depends on *when* we get the vocal, because a lot of times we get it last. With Dia Frampton, the vocal was sort of first on that song. [*Plays skeleton version of "Over it," with only Dia singing and a strummed acoustic guitar.*]

SK: So Dia had the one part—the "oh my" part—and when she came in, we brought it together with this whole other thing. I loved the way that innocent little voice is going along, and then she nails that "I f**ked up" line.

I would figure that the majority of your tunes *don't* start like that?

KJ: Most don't. Most people assume that we start with drums, but it always works out worse to do it that way because the drums need to *support* the song. Generally, it doesn't work that well when we try to build a song around just the drums.

SK: Here's a first version of the track "Grace." [*Plays a version of "Grace" with no vocals.*]

KJ: The one key synth line that's in the finished product is only in for a four-bar section in the original version.

SK: It's like that Stevie Nicks tune, "Stop Dragging My Heart Around." There's that really great, uncomplicated groove between the drummer and the bass player with beautiful, heart-wrenching things on top. So we don't always need to throw around a bunch of angry sounds that sound like a garbage truck just took a sh*t on a robot. [*Everyone laughs.*]

A lot of your music has a definite rock groove. What's the inspiration for that?

SK: Nick [Thayer] and I definitely have an appreciation for rock drummers. They have this undeniable thing where they're just being *animals*. Coming home and playing and listening to the *Star Wars* score, I wanted to be a drummer so bad and my mom wouldn't let me. I swear, after I'd get all my schoolwork done, I'd sit in the living room with my headphones on, take a stick from the back yard, and I'd just air drum.

As a rule, do you hear a part before you reach for a synth, or do you reach for a synth and get the part out of it?

KJ: If we're working on a track, and we hear a sound in our minds, we'll gravitate toward a synth that we think can make that sound. But, a lot of times, tracks will start with us turning on an instrument we haven't picked up in awhile.

SK: Yeah. We'll get this bad boy up, and make some noise. That's basically it. Like, "Oh, look at that. Look at that unruly son of a bitch!"

KJ: And that doesn't necessarily make the song, but what we're looking for is something really cool to develop.

Do you tend to gravitate more toward hardware than software?

SK: When we're in the studio, yeah.

KJ: We do, but I tell you, plug-ins are getting better and better.

SK: We love the Arturia stuff. It's really amazing. We love the ARP 2600 and the Moog emulations. I love the Oberheim SEM, too—that was one we never really had. I knew the sound, but I didn't know at the time it was an Oberheim. But I really do like that sound—that thin, filtery stuff that the SEM can do. The choices are going up!

The sound of the album really evokes two kids having fun.

SK: If I could just be experimental every single day, that'd be what it's all about! But there's still this balance of creating a song that's interesting and palatable, versus being aggressive and "anarchistic" with the sound—so as to create something that turns people on and stays with them. ♫

GAVIN DEGRAW

SPARKING KEYS TO CREATIVITY

Though Grammy-nominated and multi-platinum-selling Gavin DeGraw was raised in a prison town two hours north of New York City, and had seen harsh reality from an early age, the hippie vibe of nearby Woodstock lingered in the air, offering a feeling of limitless possibility and freedom.

"Music was definitely part of our family culture. My granddad played music. My granddad's brothers played music. They were basically like a bunch of farm kids who played music," DeGraw says. "My dad plays guitar and he's a great singer. He wasn't a piano player, but he could figure it out and say, 'Here, check this out.'"

DeGraw says his exposure to live music at an early age helped him build a passion for learning to play. His brother already had a three-year jump on playing guitar, so DeGraw gravitated toward the piano. "My family was unusually supportive about playing music because they just loved music. So when I told them I wanted to play rock and roll, they were like, 'Cool, yeah, go do that. Good idea.' It was weird how there was no way to be rebellious about it."

DeGraw's songwriting reflects that freedom, incorporating aspects of several different popular music genres into one album, from stripped-down Americana and analog synthesizer sounds to hi-tech electronic dance sounds.

Read the entire interview and see the keys to Gavin's sounds at guitarcenter.com/gavin-degraw

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BRIAN HAAS

HOW *NOT* TO BE A MUSICBOT

BY ROBBIE GENNET

PUTTING THE MUSIC OF BRIAN HAAS INTO WORDS IS LIKE TRYING TO DESCRIBE a chameleon in a crayon factory. Haas is founder and helmsman of the Jacob Fred Jazz Odyssey—a group that has consistently explored both inside and outside the jazz idiom to deliver a unique take on American instrumentalism. Throughout many iterations of the group, Haas as remained the constant, playing piano or Rhodes with a melodica close at hand. Currently the band has pared down to a trio with Chris Combs on guitar and Josh Raymer on drums. Instead of filling the revolving bass slot, Haas took on keyboard bass. Haas also recently finished up a solo tour supporting his latest solo album *Frames*, which features Matt Chamberlain on drums and some of Haas' tightest compositions yet.

You had spoken about writing *Frames* in 12 different keys. . . .

Frames is one piece in all 12 keys. I started with *C* natural and ended with *B* natural. All 12 pieces are minor and major and yet neither minor nor major—I still can't tell, can you? I got the basic concept after Matt Chamberlain confirmed the recording session with me. I wanted brand new compositions that completely played on his strengths in the studio. I also wanted material that would be completely different from anything that I have done before so I thought of each piece as an exercise in each key. I also wanted to try a more composed approach—to write a record that saved the improvisation for the live show.

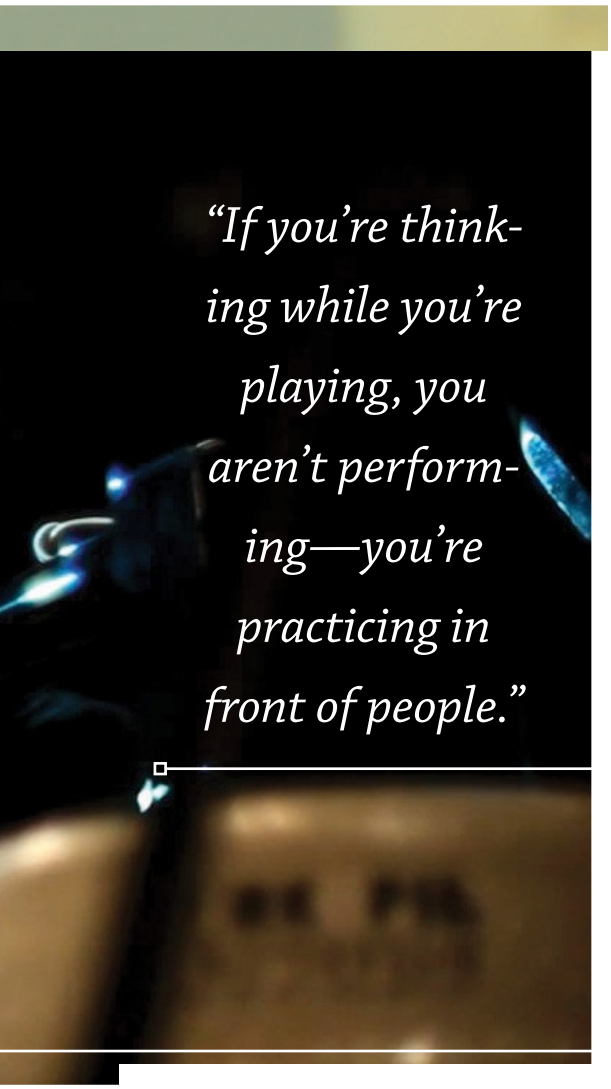
At what point did you decide on the piano-drum configuration?

I wasn't totally sold on the piano-drum configuration until I confirmed Matt. When he and I were talking about it, I gradually realized the music had to be based around the two of us. I confirmed Matt around the end of November 2012 and I wrote the album during December.

How much direction did you give Matt versus just seeing what he came up with?

Matt received very little instruction from me at the two-day session I had with him. He's a true master, able to turn musical skeletons into sentient beings. Being in the studio with him was effortless, but learning this music after I wrote it wasn't! Much of it fits strangely under the hand. The album also turned out very different than I thought it would. I initially wanted a more electronic thing but it turned out to be mostly piano and drums.

Can you quantify what elements of your playing constitute *your* style, common to both JFJO and *Frames*?



Many people have said that I have my own style and I'm grateful for that. But I want my style to change a little bit every day. I have always been equally influenced by all genres of music, especially jazz and classical. Two of my favorite combos are Coltrane and Bartok, and Monk and Prokofiev, because those cats remind me of each other. I love dichotomies. I love finding things in common in supposed opposites rather than finding differences. That's my style in a nutshell. I wrote *Frames* to force a style change within myself as a composer and a pianist. *Frames* has definitely helped me understand what I want to do next with JFJO.

While your early period felt more like jazz, the newer band has more of an Americana feel, most likely due to the slide guitar work of Chris Combs. Is there an obvious trajectory?
Change is the only constant. Jacob Fred is my jazz baby that I started as an eight-piece collective in 1994. We're now back to a trio with me doing all the bass on a Moog Minitaur and Sub Phatty. This new lineup is my favorite and the most musical—the deepest thing I have ever been a part of. Combs and Raymer grew up listening to JFJO from middle school on and they know the dialect. Lately Combs has been playing just as much electric guitar as lap steel, and I'd say we have more of a post-rock meets J. Dilla thing happening. Or maybe rock 'n' roll meets Flying Lotus? I don't know what to call it, but it rocks, yet has that Coltrane thing happening that we've always loved.

Does the physicality of the piano affect your melodic and harmonic sensibilities?
The 88 keys have always been the entire 50-piece orchestra to me. Every instrument in the history of mankind is somehow represented within the piano if you have a good imagination. I've been playing since I was two and I'm more comfy sitting at a piano than anywhere. What affects me more than the piano in general is the uniqueness of each instrument and each room. Or what I'm thinking about that day, how my heart feels, how recently I've done yoga, the humans listening to me in the room, and the particular energetic buzz of the place I happen to be that night.

When you're improvising, do you think about melodic construction in the moment?
No. It's totally blind. I'm totally not there. Sometimes I have the sensation that I need to restrain myself, and one of the only things that pops into my mind is to *relax*. And then I relax, and then I forget again. Or I'll get the sensation that something needs to grow so that I'll change it. I don't know if it's thoughts—it's more like feelings. Not "thinking" is super important. You have to think to get to where you don't think. If you're thinking while you're playing, you aren't performing—you're practicing in front of people. Which is fine, but I don't do that. The end goal is to be able to just sit down and *go*. The physical and mental stuff is for the woodshed.

What do you recommend up and coming piano players do to enhance their evolution and develop their own voice and style?
Great question. Find your own "music theory." Invent your own voice. Don't let music school turn you into one more "MusicBot 4,000." Instead, go into the woods and be alone with your thoughts or sit on a log by a stream and mediate—whatever it takes to get yourself out of your routine. I think that "jazz school" has created a generation of musicians who play licks really well but mostly don't say anything new or convincing or spiritual or fun. I'm so exhausted with the new young lion pianists. They mostly play derivative, fast B.S. that I find unlistenable, and it all sounds like the same thing: no balls, no risk, no swing, no feel, nothing psychedelic happening at all. Have all these young jazz-bots never listened to Coltrane or Hendrix? The cats that have something to say on the piano or any instrument are those who create their own way or road to get there.

How can you create your own voice on an instrument when you take the same boring-ass jazz school road that everybody else does? You can't! I think the worst thing that ever happened to the jazz art form is over-schooling. To play jazz, you must live jazz every day. Real jazz should be risky every second, not pedantic and safe. Playing licks and running scales is not playing jazz. So you can transcribe Herbie—who can't and who cares?

You certainly had a good deal of formal music education, though. Did it help or hinder you, and did your experience figure into your current, critical view of music school?
Well, my music education was unique. I started in the Suzuki classical method at age four and faked it entirely by ear until age 16 when I was forced to learn to read music. I got a full ride to college for classical music and studied classical composition and piano. I got mad and switched to jazz at 19 with no clue what I was doing. I started gigging with JFJO after I'd been playing jazz for only a couple of weeks! Between the ages of 19 and 21, I drove to the north side of Tulsa many mornings before class and woke up a genius named George Dennie, who used to play with the Brecker Brothers. I begged him to play four hands with me.

So yes, I had some formal training, which I think can be important for some people and unimportant for others. My training personally gave me as much to unlearn as it gave me great starting points for learning—probably 50/50. I believe the importance of music education, like all expensive "formal learning," has been overemphasized to the middle class by people who are good at selling and marketing their thing, which is good for all the colleges and universities, obviously. It all depends on the person, but a lot of cats are all starting to sound the same, while a lot of other cats--who also went to music school—don't sound like robots and are really innovating. Again, the effect of music school is all about the individual. Just make sure you keep an open mind and acknowledge that there's more than one way to skin a cat. ♫

Liv Warfield

BY JON REGEN

VOCALIST AND NEW POWER GENERATION band member Liv Warfield's new release *The Unexpected* is out now. Executive-produced by Prince and stocked with the searing, soul-infused keyboards of Chris Turner, the album proves Warfield is an artist to watch in 2014. Find out more at livwarfieldmusic.com.

HOMETOWN: Peoria, Illinois.

MUSICAL TRAINING: "I started my music career very late. I was an athlete for the majority of my life and most of my family was unaware that I could sing until recently. I have really learned to be a better musician from the mentoring that I've received from Prince. The band members of the NPG are all extremely talented and this experience has allowed me to grow as a singer, writer, and producer."

FIRST GIGS: "I performed with a local hip-hop band in Portland called Money & Lovin'."

MUSICAL INFLUENCES: "These include Tina Turner, Diana Ross, Whitney Houston, Sade, and Prince. I think you can hear some of them in my music. I hope that in my lifetime that I will have a chance to meet Tina, Diana, and Sade."

WHAT I'M LISTENING TO RIGHT NOW: "My parents exposed me to a great deal of music from the 1970s and I continue to be inspired by it. Currently, I'm listening to Vintage Trouble, Jarrod Lawson, Isaac Hayes, and Mother's Finest."

BIG BREAK: "My big break came from becoming a member of Prince's band, the New Power Generation. Prince saw a YouTube performance video of mine, and called me one day to come to Paisley Park. I was so honored to be able to spend time with him and sing for him. I'm proud to be a member of the band because it truly is a family. The NPG Hornz players are a big part of my album."

FAVORITE KEYBOARD GEAR: "My keyboard player Chris Turner uses a Yamaha Motif, a Hammond B-3 organ, and Yamaha C7 piano. Chris told me that we couldn't do the album without an authentic vintage B-3, so we rented one. My five brothers got up at 7 in the morning to pick it up in a truck and bring it to the recording studio."

WHAT'S NEXT: "My journey is just beginning! I'm looking forward to my album release and touring with Prince in 2014."

ADVICE: "No matter what you do, work hard, preserve the music that came before us, and create music that will inspire those that come after us. Although I'm fortunate to sing for Prince, I worked extremely hard and made lots of sacrifices to get where I am today. I was determined not to give up, regardless of what hurdles were in front of me. I stepped out of fear and went after my dreams."

LIV'S KEYBOARDIST CHRIS TURNER

ON THE HAMMOND ORGAN: Close is not good enough! When you've grown up playing Hammond organs, you understand the feeling you get while sliding onto the bench and the sound of the organ warming up after starting it. From setting the drawbars to your personal liking to clicking the Leslie switch, the natural bite and aggressive tones you get with Hammond organs stands alone. You just know when it's the real thing!

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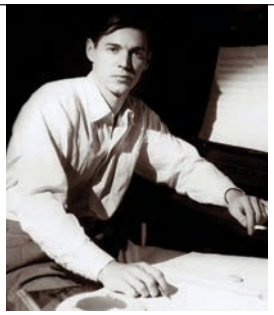
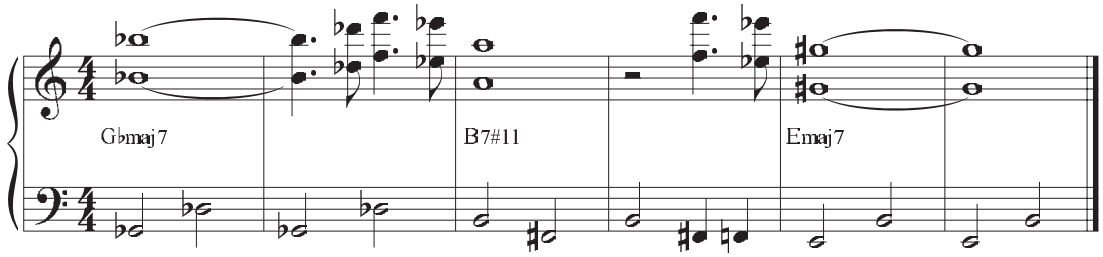
5 WAYS TO PLAY LIKE Antonio Carlos Jobim

BY BRIAN CHARETTE



THE BRAZILIAN PIANIST, COMPOSER, AND SONGWRITER Antonio Carlos Jobim was one of the most influential musicians of the past century. Originally from Rio de Janeiro, Jobim found fame providing music for the 1959 film *Black Orpheus*. In 1964, he teamed up with fellow musicians Joao Gilberto and Stan Getz for the album *Getz/Gilberto* and sparked a worldwide obsession with bossa nova music. Here are five exercises that illustrate some of the important aspects of Jobim's often-underrated piano work.

Ex. 1.

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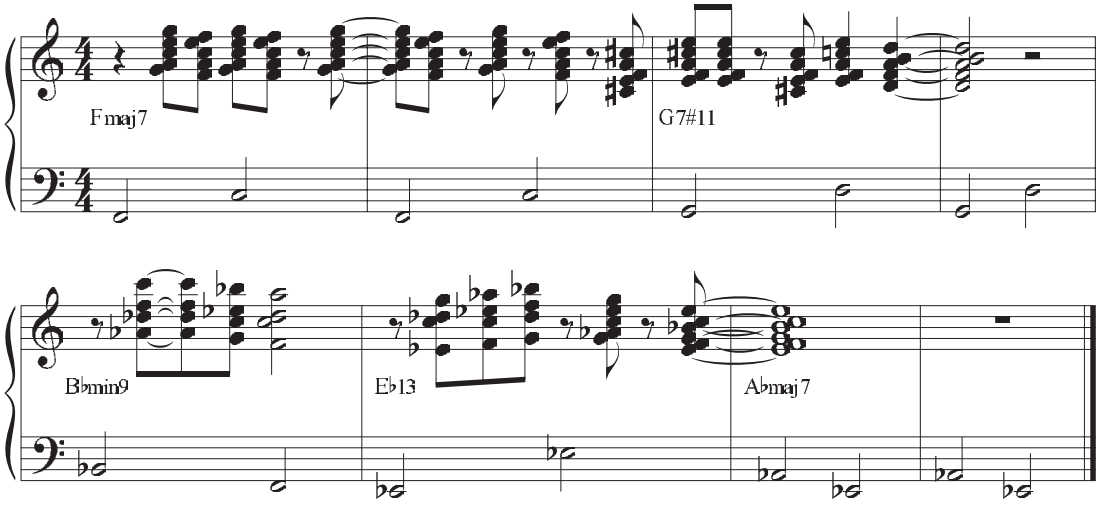

1. Melodic Improvisation

Ex. 1 is inspired by Jobim's playing behind vocalist Astrud Gilberto on his storied song "The Girl from Ipanema," from the 1964 album *Getz/Gilberto*. Notice the minimalism in the piano improvisation, where octaves paint a simple, consonant melody that outlines the chord changes. Also notice how the bass plays half-notes, adding to the almost impressionistic sonic canvas.

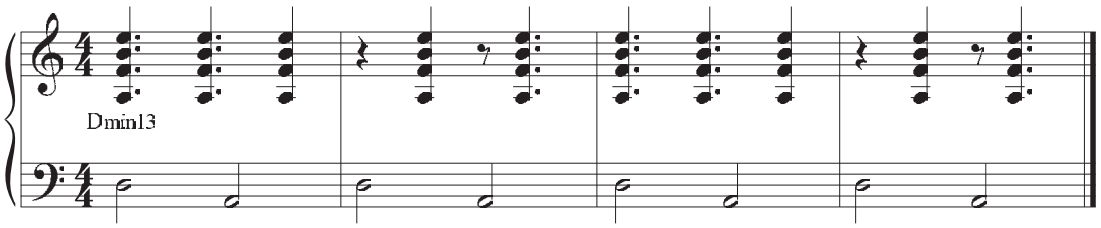
2. Block Chord Solos

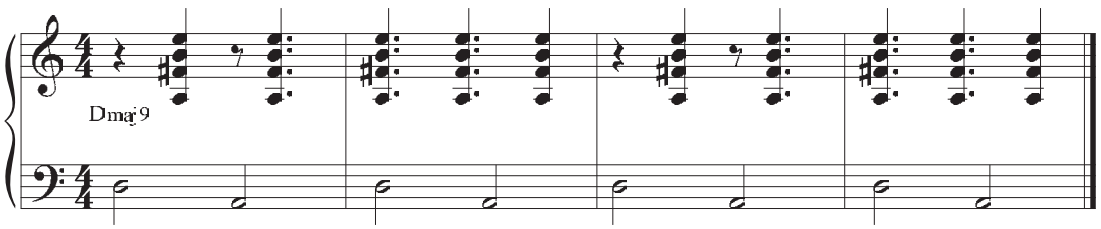
Jobim had a great pianistic vocabulary that he often employed during his solos. **Ex. 2** demonstrates his frequent use of *block chord solos*. Here I've harmonized a simple melody with octaves on the outside and chord tones with dissonant notes in the middle. This is a loose interpretation of George Shearing's block chord style. The important part here is to keep the octaves on the outside with the corresponding harmony on the inside. Slight variations can be seen in measures 5 and 6, where "drop 2" voicings are used. (Drop 2 simply means to take the second note from the top of a piano voicing and drop it down to the bottom note). The last two voicings return to block chord form. It's nice to switch between these two methods during a chordal solo. These voicings should be played with both hands with whatever fingerings feel most natural to you.

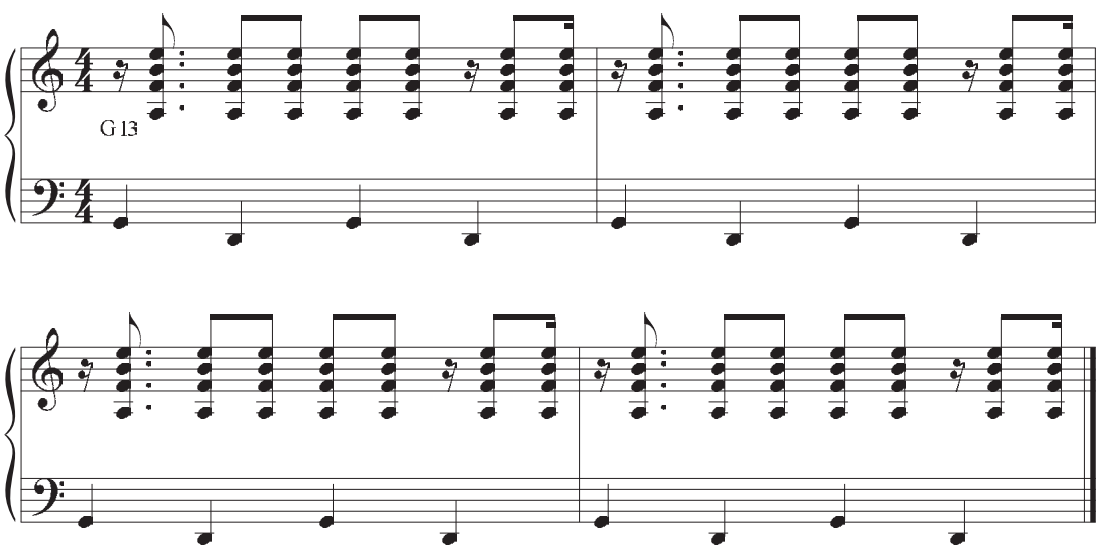
NILS WINTHER

Practice Tip

"Antonio Carlos Jobim's piano playing is often quite minimal and gentle," says keyboardist and composer **Brian Charette**. "Remember that Brazilian music tends to be slightly freer and less strict than other forms of Latin music." Charette has worked with Joni Mitchell, Michael Bublé, and Rufus Wainwright. His latest album is *Music for Organ Sextette*, on SteepleChase Records. Find out more at kungfugue.com.

Ex. 3.

Ex. 4.



Ex. 5.

3. Brazilian Clave Comping

Ex. 3 illustrates a rhythmic comping figure in what is known as a "Brazilian clave," which Jobim frequently used in his piano work. This rhythm is often heard on the snare drum in bossa nova music. The chord voicing here is in "drop 3" form, which takes the third note from the top of the voicing and puts it on the bottom. Remember that Brazilian music tends to be slightly freer and less strict than other forms of Latin music. Practice these rhythms until they feel organic and fluid.

4. Samba-Reggae

When we reverse the rhythm from Ex. 3, we arrive at the one in **Ex. 4** which is sometimes refereed to as Samba-Reggae. Note that we've now moved to a major tonality with our drop-3 chord. Both of these last two examples are effective comping rhythms to use on the piano. Remember to change your pattern gently as the tune progresses.

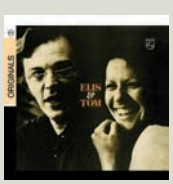
5. Partido Alto

The rhythm in **Ex. 5** is derived from another form of Brazilian music, the samba. This rhythm is known as *partido alto* and is closely associated with Rio's yearly Carnival celebration. While playing a bossa nova tune, try using this rhythm during the solos to add different rhythmic dimension to the mix.

Listening List

STAN GETZ AND JOAO GILBERTO
Getz/Gilberto

ANTONIO CARLOS JOBIM
The Composer of Desafinado, Plays



ANTONIO CARLOS JOBIM AND ELIS REGINA
Elis & Tom

Video: Antonio Carlo Jobim's classic song "Wave."

Hear Brian play the audio examples from this lesson.

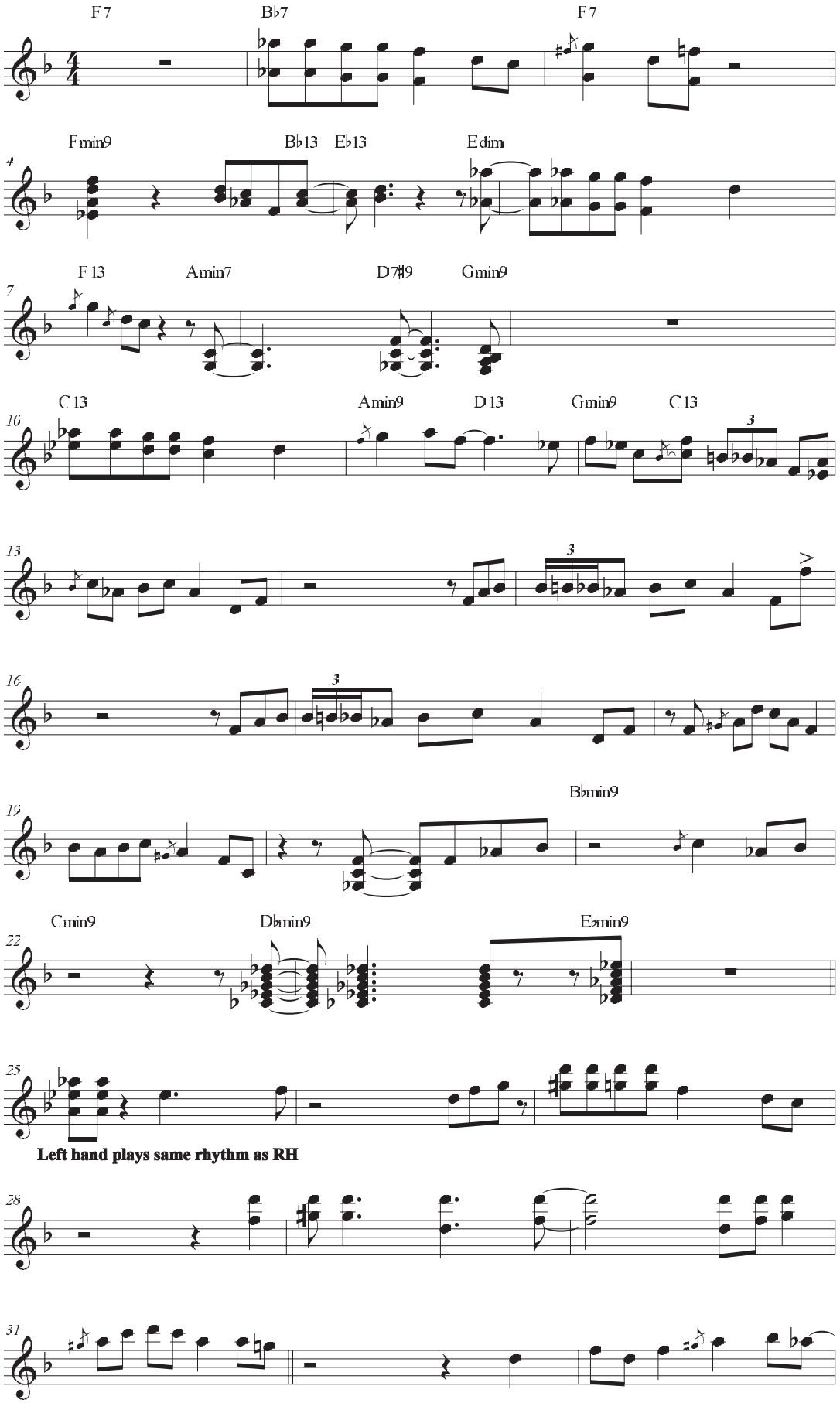
keyboardmag.com/march2014

Theme and Variation
IN SOLO CONSTRUCTION

BY JEFF LORBER

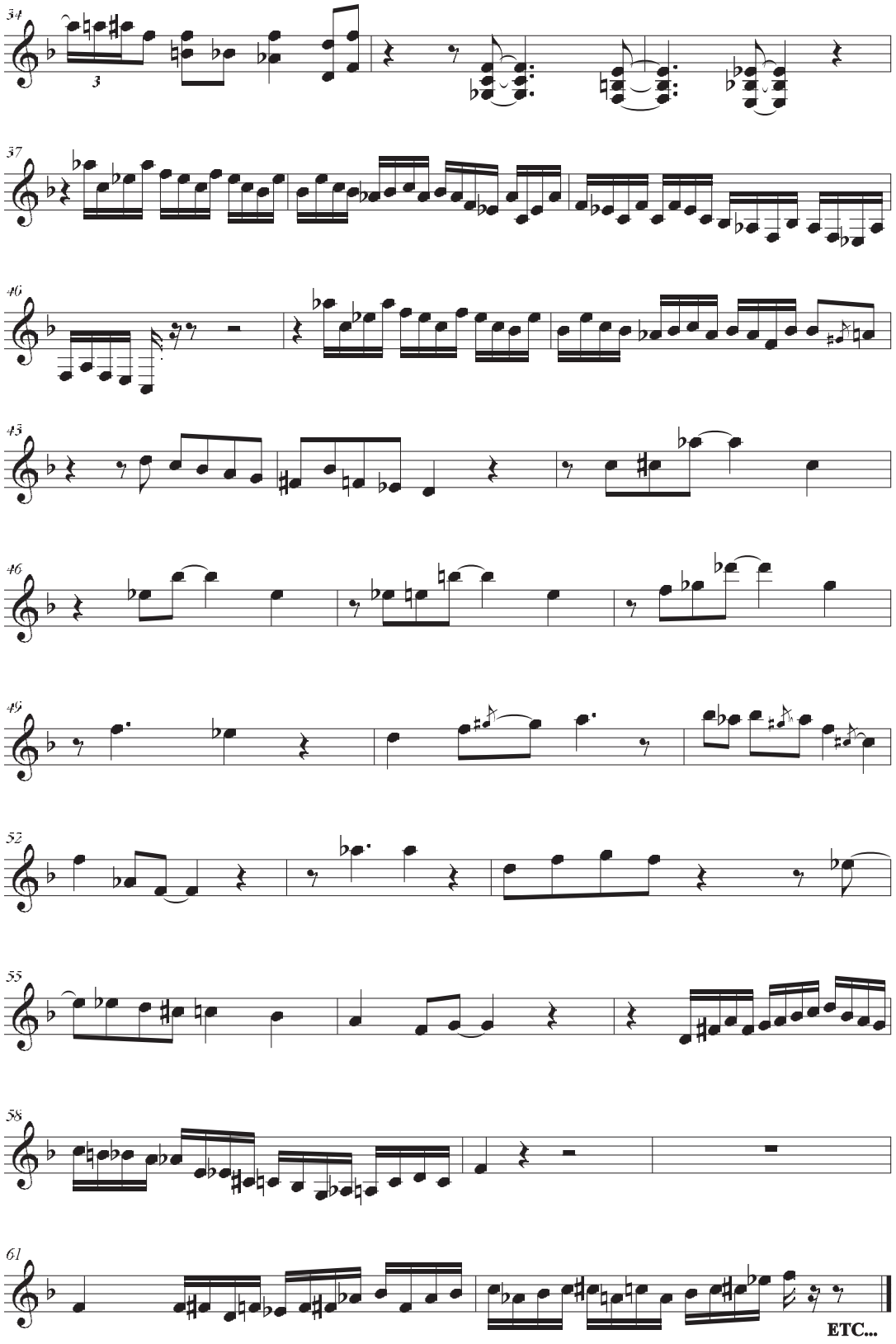
THE CONCEPT OF THEME AND VARIATION IS ESSENTIAL TO COMPOSITION AND solo construction. Since a melody can be looked at as sort of a "crystallized improvisation," a good solo can and should contain melodic nuggets or "hooks" that can be developed. Sometimes phrases that occur in a song's solo can be as memorable as the melody of the song itself. Theme and variation can be approached on either the "micro" or "macro" level. The micro approach would be to take a little piece of a scale or arpeggio and move it around, starting it on different pitches or even displacing it time-wise. A more macro approach might be something like the transcribed solo that forms the whole of this lesson, where the first part of a blues theme is stated and then repeated with variations. Let's look closer at this solo and examine how theme and variation are used in realtime performance. Make sure to listen to the recorded example online because reading the notes alone won't fully impart what the true feeling of the music is about.

Theme and Variation in Use

Instead of numbered sheet music snippets as per usual, here's an extended transcription of an improvised blues solo in *F*. The phrase that begins on the second bar is repeated in bars 6 and 10, with slightly different resolutions to the phrases and also timing.

Headmaster Harris

"The great saxophonist and composer Eddie Harris says in his book *The Intervallistic Concept* that 'a solo is like a lecture on a specific subject. You have to keep the conversation (solo) relevant to the subject at hand (melody),'" says acclaimed fusion keyboardist **Jeff Lorber**. His latest release is the Grammy-nominated album *Hacienda*. Find out more at lorber.com.

Bar 15 starts the second section of the blues. Here, the theme and variation occurs in a one-bar pattern instead of a two-bar pattern. The resolution on bar 13 ends on *F* above middle *C*. In bar 15, it resolves an octave higher. Bar 17 resolves to *F* in the lower register, but this time the phrase extends and then resolves on middle *C*. You'll notice that this time around, the blues has a different turnaround that goes from *B♭min9* to *Cmin9*, then *D♭min9* and *E♭min9* before resolving back again to *F7* at the beginning of the next phrase. This harmonic variation makes the blues a little more interesting and less predictable.

The phrases starting on bar 25 return to a two-bar pattern. They are played in a block chord style, where the left hand doubles the rhythm of the right hand. This is an effective way to solo and one which helps accentuate the melody. The renowned pianist Red Garland was a great proponent of using block chords in his solos. Check him out, especially on the recordings he made with trumpeter Miles Davis in the early 1960s.

The phrases starting on bar 37 are built on pentatonic scales, played with some freedom. The phrases on bar 45 are repeated intervals that follow the alternate turnaround changes mentioned earlier. The section of the blues that follows goes back to a simpler thematic approach and then resolves the phrase with a fast bebop lick. All of these devices illustrate how theme and variation can be used to make an improvised solo more effective and exciting.

SOUNDCLOUD

Jeff plays through this lesson.

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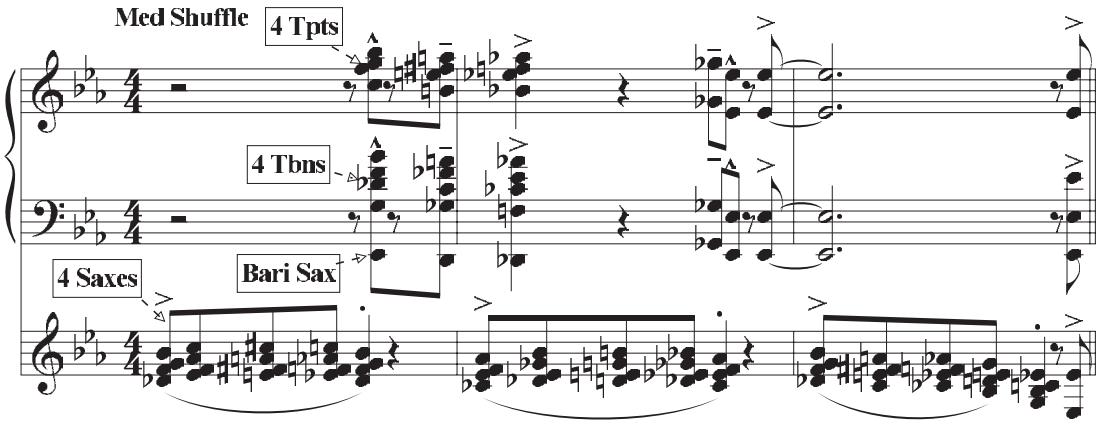
Jazz Arranging Power

BY SCOTT HEALY

IN MY LAST LESSON IN THE JANUARY 2014 ISSUE, I DEMONSTRATED HOW adding just one note can change a chord's color and character. This month, I'll offer up ways to give your arrangements added punch, power, and clarity. I used many of these techniques on my new album *Hudson City Suite*.

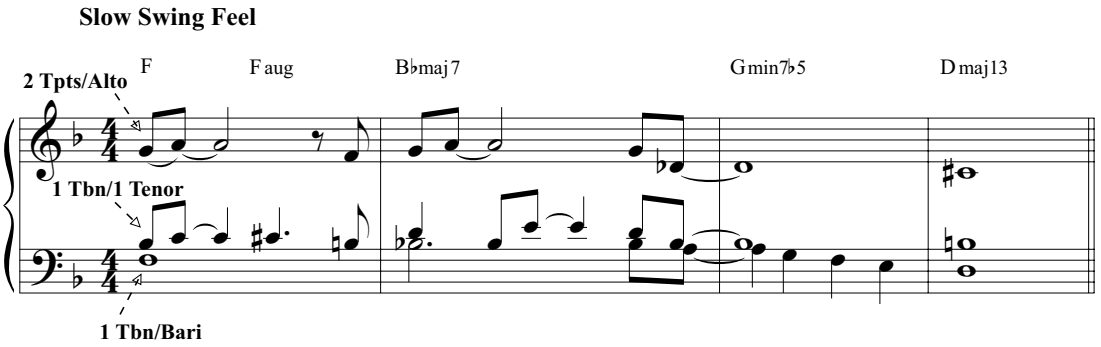
Rules and Caveats

There are just a few rules to keep in mind when constructing your arrangements—rules that you can choose to break as long as you know them first. First, don't put the root in the middle of the chord, as it really detracts and makes things sound classical. Second, try to use wider spacings in the lower register of a voiced chord. Otherwise, it will be a muddy day in overtone city! Finally, don't write two instruments on the root of a voiced chord. You gain nothing but intonation problems while losing another available voice.

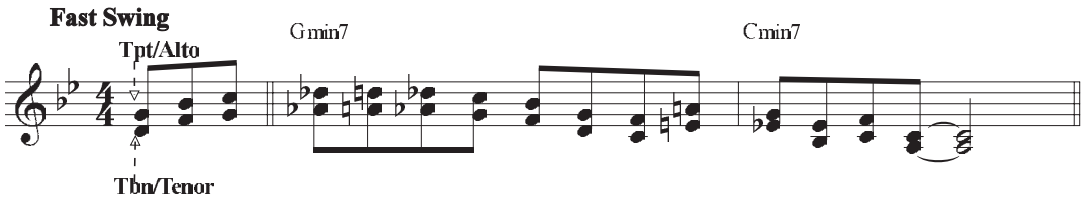
Ex. 1.

1. Call and Response

Ex. 1 illustrates the time-honored technique known as "call and response," which creates excitement by way of a musical "dialogue." Here's a traditional big band example: The saxes riff with a close-voiced, harmonized line, and the first brass chord is voiced with a wider spread between notes at the bottom but more closely at the top. Then the brass play a *unison* riff doubled in three octaves. The sax riff will sound tight and swinging, the brass will be powerful and full and the octave unison passages will be clear and loud.

Ex. 2a.



Ex. 2b.



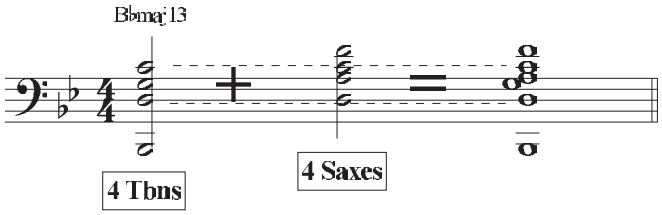
2. Sweet and Light

Doubling *across* instrument choirs (*i.e.*, woodwinds and brass playing the same notes or lines) is often my secret weapon of choice. Pairing tenor saxes with trombones, trumpets, with alto saxes—or even bass with bass clarinet—helps enrich and widen the music at hand. Just about any combination will work. **Ex. 2a** comes from the "less is more" school and features three-part harmony with unison doubling, here with a six-piece horn section. The voicing comes from melodic moving lines. **Ex. 2b** fully maximizes the sound of a small section with unisons: alto and the trumpet double the lead, and the trombone and tenor sax follow in fourths and thirds below.

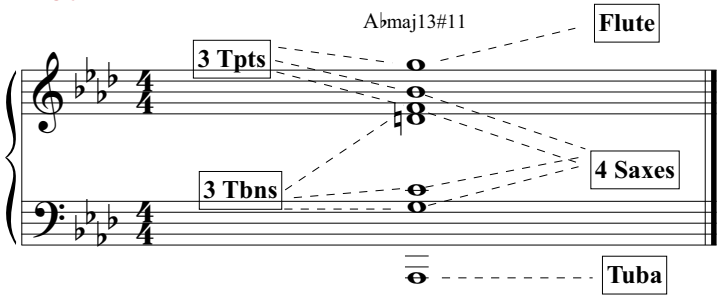
Hit the Books

"Arranging and orchestration textbooks actually work," says **Scott Healy**. "My former teacher Ray Wright's *Inside the Score* takes apart famous big band arrangements by Thad Jones, Bob Brookmeyer, and Sammy Nestico. Ray explains large ensemble voicing and voice doubling in detail. Also Don Sebesky draws on his decades of experience in the studio in *The Contemporary Arranger*. Both texts come with CDs so you can hear the notes in action." Healy has worked with Tony Bennett, B.B. King, Bruce Springsteen, and Christina Aguilera, and is the longtime TV band keyboardist for Conan O'Brien. Healy's Grammy-nominated album *Hudson City Suite* is out now. Find out more at bluedogmusic.com.

Ex. 3a.



Ex. 3b.

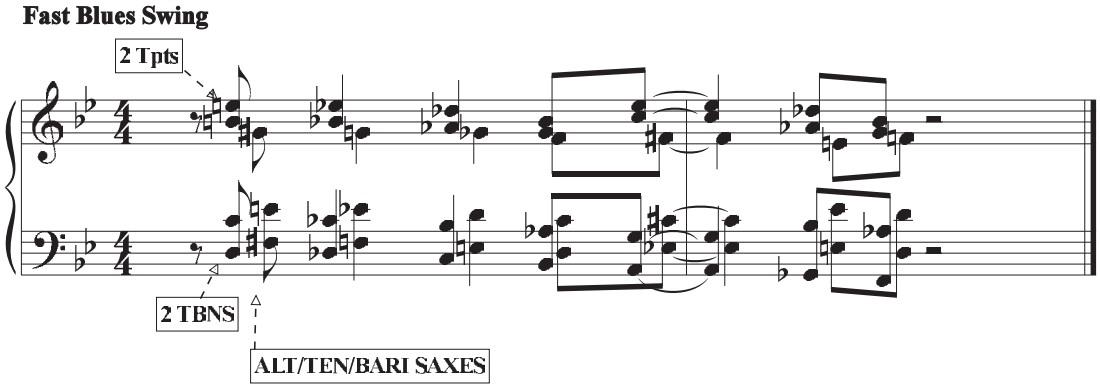


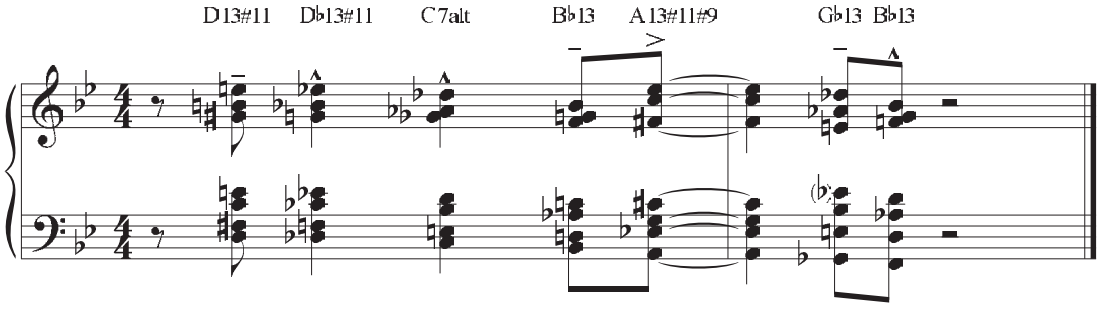
3. Richen Up

You can fatten up your chord voicings with inner unisons. I call this "cross-doubling," where the doubled notes spread and richen the sound. Here you can use more instruments on fewer notes. In **Ex. 3a**, middle *C* and the *D* below it are doubled. Eight instruments play six notes. Both the trombone and sax voicings are solid, and cross-doubling makes the section resonate. In **Ex. 3b**, we voice a big chord with cross-doubling. Here, 12 instruments are playing a seven-note chord. This sounds full, the instruments will blend well together, and no one in the band will feel left out!

4. Make it Scream

Even with a small ensemble at your disposal, you can still roar. Your assignment: In a moving "shout" passage, harmonize the notes under a riff. My band has seven horns, so I always have to weave the brass and reeds together, and keep most of them relatively *high* in their range. This passage is a harmonized *B*♭ blues riff. In **Ex. 4a**, both the brass and sax voicings each have a nice spread, and everything moves together. In **Ex 4b**, the line is harmonized in a tight and punchy band of moving chords. Remember: Always make every voice count!

Ex. 4a.

Ex. 4b.



Hear Scott play exclusive audio examples from this lesson online.

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Fig. 1. Roland's UM-One USB-to-MIDI cable.

MIDI Reloaded

PART 1: BASICS AND BENEFITS

BY CRAIG ANDERTON

THREE DECADES AGO, KEYBOARDS WERE WEDDED TO TONE GENERATORS in the same enclosure, and digital audio recording was expensive and rare—but then MIDI appeared. MIDI is a digital language by which synths, sequencers, and controllers talk to one another. Among its early benefits was separating the keyboard controller from sound generators so that a single keyboard could control multiple, less expensive, and typically rack-mounted tone modules. MIDI also offered a high-quality "multitrack" recording experience to composers and working musicians who couldn't have afforded their own multitrack tape machines. Today you can easily record 100 tracks of digital audio on a basic laptop, so MIDI may seem irrelevant in the studio. Yet MIDI remains not only viable, but *valuable*, because it lets you exploit today's studio in ways that digital audio still can't.

MIDI basics. Digital audio is a representation of sound *itself*—the numbers involved are eventually converted back into a voltage that can drive an amp or powered speaker. MIDI data is a set of *instructions* that in turn tell something that can make sound—like a hardware synth or soft synth—what and how to play. The classic analogy is the old-fashioned player piano: The paper piano roll isn't a recording you can play back in the absence of the piano itself; instead, the holes punched in it are read by a mechanism that then tells the piano's hammers what strings to hit.

Another good analogy is word processing. When you type on a QWERTY keyboard, it generates digital data representing letters, spaces, punctuation marks, and so on. This data flows into your computer, which can then translate the data into pixels on a monitor so you can see what you've typed, cut and paste words, email it, and so forth. A MIDI musical keyboard translates your playing into data that flows out from a MIDI output, then travels over a serial connection (more on this later) into a synth, tone module, or your computer. The data doesn't *equal* the music any more than the data from your QWERTY keyboard equals your native language, but in both cases, the former issues marching orders to a system that then creates the latter.

Having a set of instructions that can be saved and edited separately provides all kinds of benefits. Before discussing those, let's cover a few more MIDI basics.

The MIDI interface. MIDI's interface protocol differed from the ones used at the time for printers and other peripherals. It used a five-pin DIN connector (see **Figure 1**) for the MIDI output that transmitted data from your keyboard or computer, and another DIN connector for the tone module or computer MIDI input that received data. Early personal computers needed an external interface box that had MIDI connectors and converted the MIDI data to and from a standard computer interface protocol. (Atari's ST

Fig. 2. Virtual instruments like MOTU MachFive, IK Multimedia SampleTank, and Native Instruments Kontakt (shown) are multitimbral, meaning they can play back different instrument sounds on different MIDI channels.

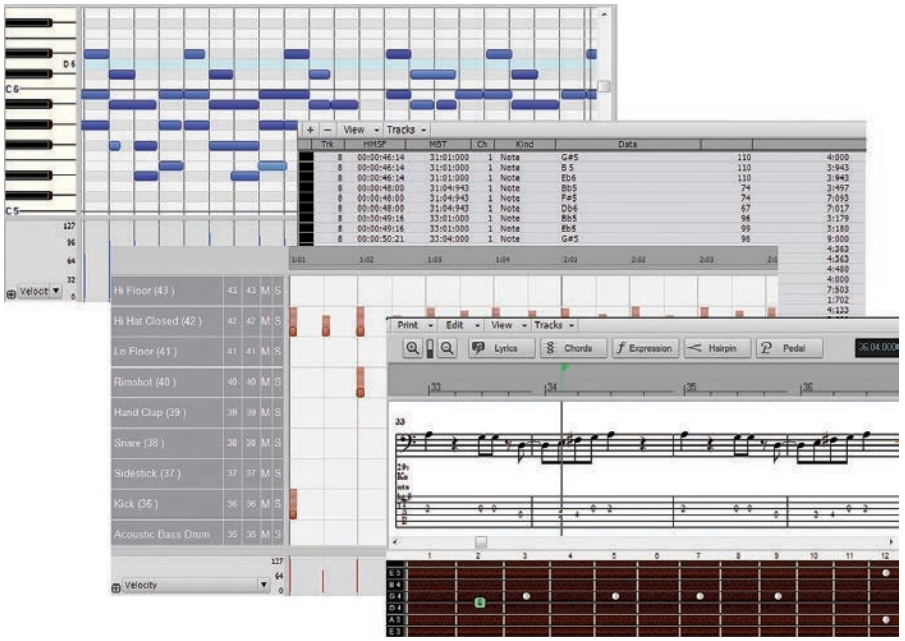


Fig. 3. Cakewalk Sonar's MIDI editing views, from top: piano roll, event list, drum map, and staff with guitar tab and fret view.

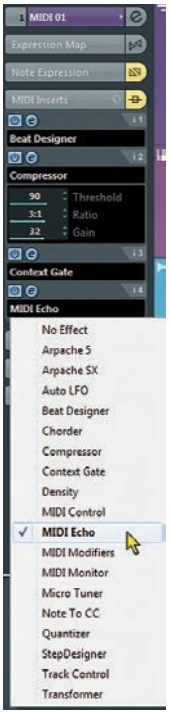


Fig. 4. Steinberg Cubase lets you insert up to four MIDI plug-ins in a MIDI track.

series and Yamaha's CX5M were two exceptions; they had built-in MIDI connectors.)

Most modern MIDI keyboards interface with computers over USB; its advantages include eliminating a separate interface and higher-speed data transfer. For older synths, DIN-to-USB converter cables can provide a computer interface.

MIDI channels and ports. MIDI sends data over any of 16 channels, and tone modules or virtual instruments can "tune in" to a specific channel. For example, suppose you assign three different synthesizers to receive data over MIDI channels 1, 2, and 3. Changing the transmission channel on your controller keyboard (or on a MIDI track's output in your DAW) chooses which synthesizer will play. For layering, you can set synths to the *same* channel. If your synth can split or layer, this works by the keyboard transmitting on different MIDI channels to the sound engine.

Eventually 16 channels weren't enough, so interfaces (and even some keyboards) started sprouting multiple ports—a four-port interface can send data over 64 (four times 16) different channels. One DIN connector equals one port, but a single USB connection can handle multiple ports simultaneously.

Another development, the multitimbral synth, plays back different sounds that respond to different channels. This is ideal for computer-based multitrack MIDI recording and playback because data recorded on one channel can drive (for example) a bass sound, while another channel plays back a piano sound, another triggers drums, and so on.

Today, external tone modules have been upstaged by software instruments (see **Figure 2**), but these still take their orders from MIDI. Now let's consider some advantages of MIDI over digital audio.

Songwriting. If you start a composition with MIDI instruments, you can transpose pitch and alter tempo easily. Transposing simply tells the target synth to trigger notes that are a certain number of semitones higher or lower. For this reason, there are none of the artifacts associated with audio-based time or pitch stretching. Once you nail the right tempo and pitch for your arrangement, you can then start recording audio parts such as vocals. You can set up a multitimbral MIDI instrument template with different instruments on different channels, so as to get going quickly if inspiration strikes. You can also record "placeholder" parts to keep the creative flow going and not concern yourself with recording the perfect part, because MIDI allows for . . .

Deep editing. Digital audio allows for broad edits, like changing levels or moving sections around, and editing tools such as Melodyne are doing ever more fine-grained audio surgery. But MIDI is more fine-grained still: You can edit every characteristic of every performance gesture: dynamics, volume, timing, the length and pitch of every note, pitch-bend, and even which sound is being played. MIDI data can tell a piano sound what to play, or if you change your mind, a Clavinet patch. With digital audio, changing the instrument that plays a given part requires re-recording the track.

Different types of editing. "Piano-roll" editing is the most common way to edit, but you can also edit on a musical staff view, a grid optimized for editing drum parts, a spreadsheet-like list of every single MIDI event in a part, and in some cases, even guitar tab (see **Figure 3**).

MIDI plug-ins. These process MIDI data (see **Figure 4**). They can set minimum and maximum velocity limits, constrain notes to a particular scale, repeat data for echo effects, change the order of notes in a phrase subtly or drastically, and much more. Not all DAWs accommodate MIDI plug-ins, but most of the majors do.

Mix and synth automation. In addition to notes, the MIDI spec includes dedicated, numbered controller data options that can control panning, level, modulation, sustain, and even amount to extra hands turning your synth's knobs as you play. With a multitimbral instrument, controller signals can alter the mix by changing instrument levels on the fly.

These are the basics, but MIDI can do much more—as you'll find out in part 2 next month.

SOUNDCLOUD

Listen to *Forward Motion,* an album recorded by Craig Anderton and Spencer Brewer in 1989 that was done entirely with multitracked MIDI instruments and mixed directly to stereo DAT.

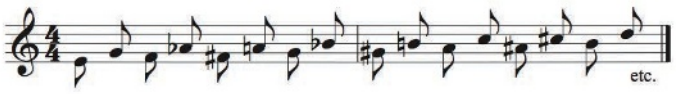
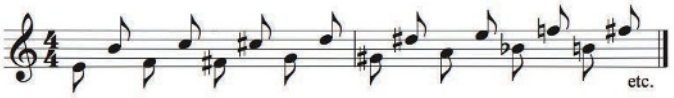
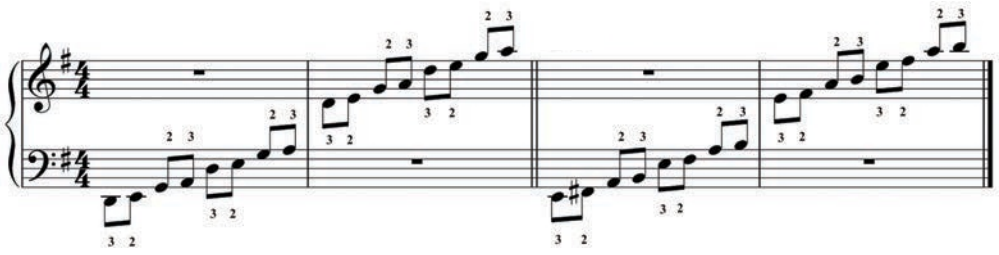
keyboardmag.com/march2014

THE ART OF SYNTH SOLOING

Nothing Wrong with Showing Off

BY JERRY KOVARSKY

WE'VE BEEN BINGING ON SYNTH PROGRAMMING FOR QUITE SOME TIME, SO let's get back to some playing techniques. At some point in the night you're likely to have a solo on a more high-energy song, and it can be fun to throw in some attention-getting riffs as a high point to your solo, or just a way to energize the tune on the way into your last chorus. Years ago I read one of Chick Corea's columns in this very magazine where he talked about liking to break up riffs between the hands, as it gave you a new, more rhythmic and percussive approach to your playing. A very fine pianist and instructor out of New York, Dave Frank (not to be confused with synthesist David Frank of The System) recently analyzed this and dubbed the technique "ten drummers." That is, each of your fingers becomes a drummer. Check out the video link at the bottom of this article (starting around 4:54 for the performance and 12:27 for the analysis) for Dave's master class. Though he demonstrated his techniques on piano, they lend themselves extremely well to synth soloing, as we'll examine here.

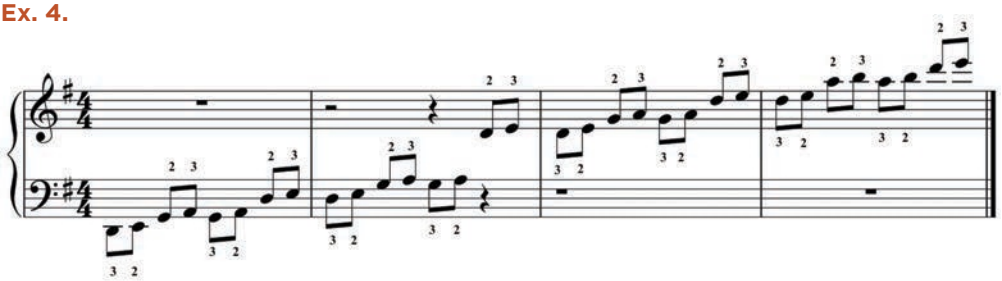
Ex. 1.

Ex. 2.

Ex. 3a. **Ex. 3b.**

Simple Two-Handed Chromatic Approach

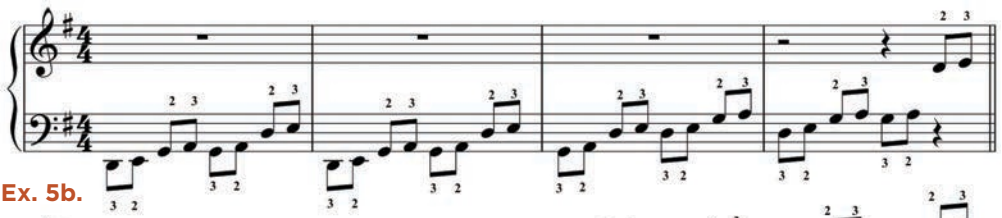
The basic concept of the "ten drummers" technique is to use only a few fingers of each hand, and alternate the right hand and left like you would a pair of drumsticks. The best way to get comfortable with it is to start with only one finger from each hand. Pick a starting tone that matches the key you're in, and an interval that you like (minor third, major third, and perfect fourths and fifths work well). So in **Ex. 1**, I'm in *E* minor and I'm using minor thirds. The notes with downward stems are the left hand; upward stems are the right. You can use the second finger in each hand, the third, or whatever feels best. Like all good practicing, start slow and speed up as you get comfortable. **Ex. 2** shows the same concept using perfect fifths.

Over time as you get more fluent, you can introduce this riff/technique into your playing in various ways. I like to use it as a way to climb up into a high-note bend that adds some modulation to the held, bent note. The notes can be played semi-detached, very short and choppy, or any number of ways. If you make longer arm movements (again, think of the drummer analogy), it can be visually exciting as well. Check out the audio examples online—although you won't see the expressive faces I made while playing it! [*Is that good or bad, Jerry? —Ed.*]

Note Flurries

Now we'll move into some two-note groups for each hand. Staying in *E* minor, I'm choosing two whole-step pairs, *D* and *E*, for the left hand (the minor seventh and root) and *G* and *A* for the right hand (the minor third and the fourth). **Ex. 3a** shows a simple way to run up the keyboard, again leading into a melodic phrase or bent note. Note the fingerings. **Ex. 3b** show some other note choices.

Ex. 4.

Ex. 5a.



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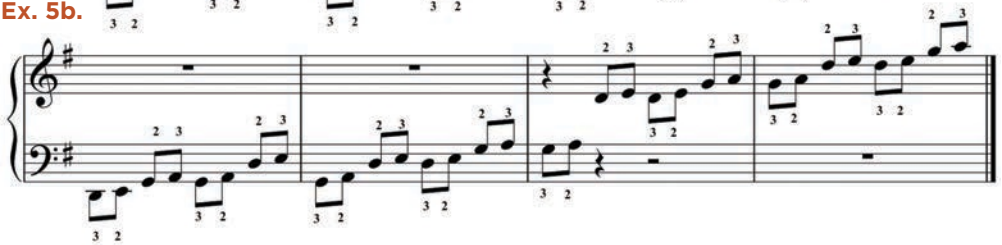
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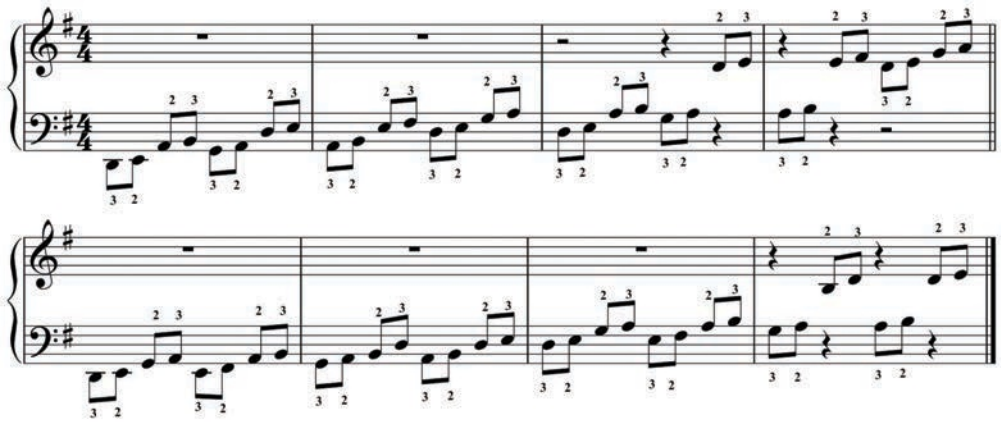
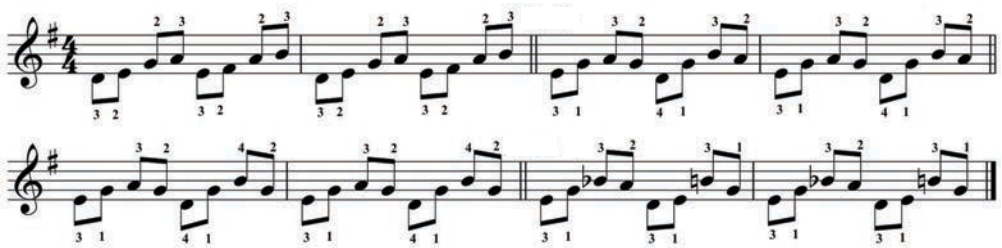

Ex. 7.

That's an okay beginning, but I like to "double back" on the right hand notes again with the left hand, as shown in **Ex. 4**. This becomes much more interesting, and there are countless variations of how you can move up and down the keyboard using these. **Ex. 5a** and **5b** show two ways of repeating a grouping before moving up to the next one. **Ex 6** shows two ways of mixing up some different notes groupings to get even more interesting.

Agitated Bees

Way back in the August 2012 column I discussed using a repeated riff/figure as a way of creating a nice groove or interlude in a solo, and as an opportunity to sweep your synth's filter while the notes repeat. We can apply this concept to the ten drummers technique. The main idea here is to *not* move up and down the keyboard; find a few notes and repeat them, ideally as fast as you can (since we're showing off). **Ex. 7** shows some possibilities, and uses a few more fingers to help you develop and expand on this technique.

But Wait, There's More!

As you play through these later examples you may notice that we're coming close to the guitar hammer-on technique pioneered by Eddie Van Halen, which is a staple of most shredding guitar players' vocabulary. That's intentional—next month we'll explore this approach in greater detail. Until then, happy sh(r)edding! ♪

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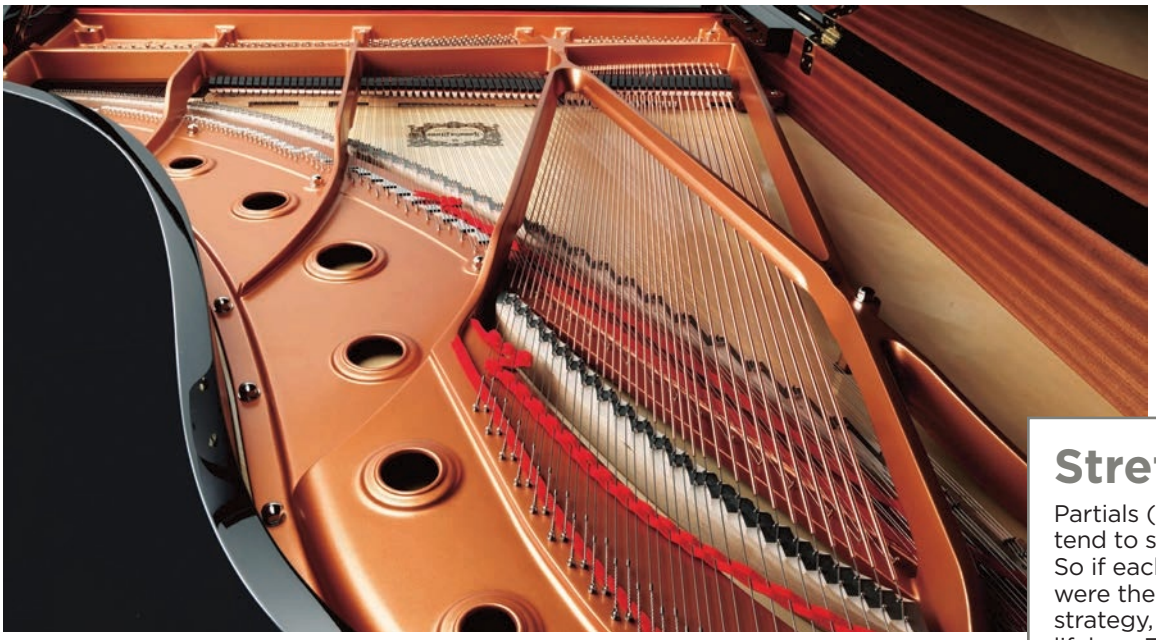

Tuning Tactics

HARMONICS, TEMPERAMENT, AND ELECTRONIC TUNERS

BY KEN DE LORIA

Stretch Tuning

Partials (ascending harmonics) tend to skew sharp in piano strings. So if each fundamental frequency were the only basis for a tuning strategy, most pianos would sound lifeless. For this reason, most by-ear tuners and most ETDs will "stretch" the upper and the lower octaves in relation to the reference "temperament tuning octave." Both the TuneLab and Verituner ETDs do the work for you. You simply specify stretch tuning and you'll get it, without having to count beats per second. Both apps allow adjustments to the stretch parameters, which is important for making a piano sound the best it can.

AS A SOUND ENGINEER, I'VE KNOWN AND WORKED WITH MANY ACCOM-plished piano players, and I'm an avid pianist myself. But until I started down the path of tuning pianos, I had no clue that the concept of a piano being perfectly "in tune" does not actually exist. Most of us know when unisons and intervals are way off. But what constitutes "in tune" in terms of being musically pleasing? The answer lies in understanding two key factors: temperament and inharmonicity.

It's a String Thing

Piano strings exhibit inherent inharmonicity. This means that the fundamental pitch, let's say the note *A* vibrating at precisely 440Hz, will exhibit harmonic content (also called overtones or partials) that is not evenly distributed as in say, a pipe organ, a Hammond organ, some synths, or many other instruments. The second harmonic, which in theory should be 880Hz, will in fact be slightly higher in pitch than twice the fundamental. The third, fourth, fifth and other ascending harmonics will rarely, if ever, be exact arithmetic multiples of the fundamental.

Moreover, when a piano string is struck by the hammer, it becomes physically displaced, causing an initial and temporary pitch change in its fundamental *and* harmonic frequencies. This is difficult to hear because the pitch displacement in the fundamental is small, yet magnified in the harmonics that are multiples of the fundamental frequency. The result of this *inharmonicity* is usually perceived as harshness, but not always. In addition to what you can hear, seeing the pitch visually wandering on an Electronic Tuning Device (ETD) readily shows what's happening.

Shorter upright pianos, spinets, and baby grands all have short strings that exacerbate inharmonicity—so will low-quality string material. Conversely, the longer strings on medium- and full-sized grand pianos, along with their typically higher quality metal alloys, are much more forgiving; partials are more closely in-tune with each string's fundamental pitch. Less inharmonicity equates to purer sound quality, but that's not always the goal of a piano manufacturer. Harmonic content can be part of a piano's unique tonality.

The "scale" of a piano—that is, the string length in relation to string tension, intended pitch, and resultant harmonic content—is a huge element that distinguishes one piano from another. Variations on scaling include the duplex scale, invented by Theodore Steinway. This is a short "non-speaking" segment of the string length, isolated from the string's "speaking" length by a bridge and roughly tuned to an octave or fifth above the note. In some pianos the non-speaking strings can be tuned; in others they can't.

Exactly how partials present themselves in a given string is not readily predictable, and it's only one of many factors in a piano's character. Were it not for the highly complex interaction of the strings, the bridge, the soundboard, the hammers, and the structure of the piano case itself, then all pianos of a given size would sound pretty much the same. But they don't, and we revel in that fact.

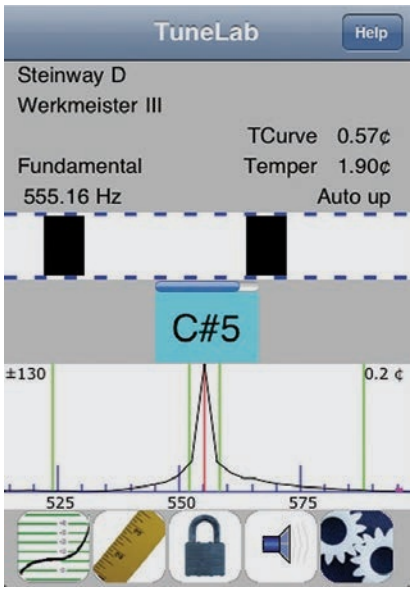

Fig. 1. TuneLab's primary display. The black bars move left or right to indicate fine pitch, while the graph below indicates coarse pitch.

Fig. 2. One of Verituner's main displays showing the inharmonicity table (left), pitch in cents (center), current note, settings, and the inharmonicity I-beam (right).

Temperament

Temperament is the frequency relationship of each interval to another within the "temperament octave" that dictates the pitch of all upper and lower octaves, and one size does *not* fit all! Numerous forms of temperament range from equal to ancient. To name just a few: 14th-century Pythagorean (1373), DeMorgan unequal (1843), Moscow equal-beating, William Hawkes Improved (1807), and the list goes on.

Temperament can be (and often is) set by ear by skilled piano tuners who count beats—audible oscillations between not-quite-in-tune notes—though the modern-day preference of many professional tuners is to hand this task over to an ETD. Fifths can be made perfect (no beating) at the expense of fourths and thirds, or the opposite can be true. One aural tuning guide, authored by W. Dean Howell, specifies 6.93 beats per second (bps) between *F*33 and *A*37. Under this same guidebook, *A*37 to the higher *E*44 should beat at 0.74 bps to achieve a perfect fifth. Point being, there is no such thing as beat-free intervals throughout the scale.

Electronic Tuning Devices

Modern electronic tools give professional tuners a whole new way to work. Pianists who can't afford to pay a tuner to show up every week might also take advantage of these, but they'll need to work through the rather steep learning curve of handling a tuning lever (also called a tuning hammer) to properly set the tuning pins. It's not easy, but it's not rocket science, either. If you just move the lever until you hear the desired pitch without "setting" the tune, stability will be elusive. This involves torquing the tuning pin upward in pitch, then relieving the torque, and then carefully adjusting each string's tension for stability.

ETDs range from dedicated hardware such as Peterson's industry-standard strobe tuners to modern apps that run on laptops, iOS, and Android. I was privileged to try out two leading apps while repeatedly tuning a year-old Yamaha upright piano in a small church—an application that many professional tuners might encounter. Both were easy to learn, yet sophisticated.

TuneLab. I started with TuneLab (tunelab-world.com), an app I ran on an iPhone 4S. The display shows an FFT-style coarse pitch graph, while simultaneously providing a series of black bars that move either left (for flat) or right (for sharp), to establish fine pitch (**see Figure 1**). The coarse pitch graph lets you see two or more unisons at the same time that are not in-tune, due to its excellent resolution. This is a very helpful feature, especially in the upper octaves. TuneLab can also sample strings in order to identify their inharmonicity and thus calculate the projected inharmonicity of the entire piano's scale.

Verituner. Next was Verituner (verituner.com), a product with significant design depth. It runs on iOS or Windows PCs, and is also available as a standalone device called Verituner Pocket. I loved Verituner's relative initial simplicity, combined with its ability to make complex adjustments to the prescribed starting points, thus giving the professional tuner a broad palette of possibilities. The display depicts a rotating icon including several additional elements (see **Figure 2**). Coarse pitch is shown much like a speedometer needle; fine pitch is depicted by a spinning rotor. Inharmonicity is displayed as a table for each string, providing valuable information about a given piano's harmonic quirks. Verituner looks at string inharmonicity in the background as each note is tuned. It doesn't extrapolate, but rather, makes a direct calculation for each string.

Parting Thoughts

Piano tuning is an art form backed by decades of scientific research. But science and the mathematical analysis of harmonics can never tell us what to *enjoy* when we listen to music. While we can analyze frequency content, we have yet to bridge the gap between objective analysis and why one subtle difference in tuning a piano might make all the difference in how a performer responds to the instrument. ETDs bring us much closer to this understanding, though none should ever be taken as a substitute for listening. ♫

***Ken DeLoria** has had a 45-year relationship with music in general and pianos in particular. He works in the audio industry as an engineer, most notably as the founder and CEO of loudspeaker maker Apogee Sound Inc. He can be reached at kdeloria@gmail.com.*

When Fake Hammond Is Good

THE B-3 SOUND IN HOUSE MUSIC

BY FRANCIS PRÈVE

IN CLASSIC HOUSE MUSIC, THE TWO MOST PROMINENT KEYBOARDS ARE PIANO AND HAMMOND B-3 ORGAN. FIRST used in the late '80s, a synthetic B-3 sound quickly became a staple in early '90s house music. The timbre in question was almost always some variation on the Jimmy Smith sound, *i.e.* the first three drawbars plus third harmonic percussion. Because it was sampled or synthesized using the gear of that era, the percussion behaved incorrectly with respect to a real B-3, in that it triggered on every note, all the time. In the context of electronic dance music, this became part of its appeal.

While its popularity has waxed and waned in cycles in the decades since, the B-3 is experiencing a comeback in the hands of modern artists like Disclosure, Hot Since 82, and Mark Knight. Let's look at how it all got started, and how you can get the most authentically inauthentic B-3 sounds into your house tracks.

Korg M1: "Organ 2"

The definitive synth B-3 sound that dominated early '90s house music was found on the legendary Korg M1 workstation. Used for both chord stabs and bass lines, "Organ 2" (preset number 17, to be specific) can be found at the heart of countless hits, both mainstream and underground. According to Korg's senior voicing manager Jack Hotop, the "Organ 2" waveform was derived from one of the sample disks for their '80s era DSS-1 sampler. Today, you need look no further than Korg's Legacy Collection and its M1 soft synth, which delivers the sound flawlessly.

Yamaha TX81Z: "Perc Organ"

Some house producers turned to less expensive gear than the Korg M1. As a result, Yamaha's affordable TX81Z, a rackmount FM synth, became a staple in many studios of the day. With four operators, arranged in eight possible algorithms, the TX81Z included 128 factory presets, several Hammond B-3 emulations among them. The most notable was preset A17, "PercOrgan," which can hold its own in any deep house track and has a slightly rounder tone than the M1. Best of all, you can find a vintage 81Z for less than $100 on eBay—at least for now.

Ableton Operator

For producers who prefer to whip up their own synthetic B-3, Ableton Live's Operator does a fantastic job. Use the default patch and switch the wavewform to "user" mode with 16 harmonics—more than enough for drawbar emulations, in other words. Stick with the first, third, and seventh harmonics and adjust their levels until you get something that's close to a B-3. Then, tinker with Operator's volume envelopes for the finishing touches.

Reason Subtractor

For Reason's Subtractor, or any two-oscillator subtractive synth, set your oscillators to reflect the pitches of the first and third drawbars, then mix them to taste. In this case, using sine or triangle waves on both oscillators, set oscillator 1 to the fundamental and tune oscillator 2 to one octave plus seven semitones (an octave and a fifth). From there, you can add a touch of click by lowering the cutoff very slightly and giving the filter envelope a super fast decay to zero, adjusting envelope depth to taste.

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KORG Volca Series

BY FRANCIS PRÈVE

Keyboard K KEYBUY AWARD

KORG HAS BEEN AGGRESSIVELY EXPANDING THEIR OFFERINGS IN AFFORDABLE true analog synths. First there were the Monotrons, then the Monotribe, then the MS-20 Mini. Now come the Volcas, which are an order of magnitude more sophisticated than the Monotribe and feature real analog sound engines that deliver tangible depth and warmth. There are three flavors: Beats, Keys, and Bass. Beats is a vintage-inspired drum machine, Bass evokes Roland's classic TB-303, and Keys lives somewhere between a straight-up synth and Korg's original Electribe. Each Volca costs only $150, which means that anyone with $450 can have a completely analog microstudio that fits in a backpack.

Common Features

All Volcas share the same exterior design, but with different panels. Each has a touch panel for entering notes or drum hits; it's a little wider on the Volca Keys to allow for a chromatic keyboard. All three include the same connectors at the top of the faceplate: power supply jack, MIDI in, voltage clock in and out, and a 1/8" headphone jack. This serves double duty as the main output (monaural, though the jack is TRS stereo).

You get eight memory slots for storing your sequences and each sequence can be one measure in length. There's no pattern chaining for song creation, and given the lack of MIDI output, no ability to export sequences to another medium—to capture your explorations, you record audio into your DAW. In practice, I didn't find this to be a problem.

My only real gripe is that no Volca has any sort of swing or shuffle. A workaround for iOS users is to use Korg's free app, SyncKontrol. In addition to turning your iPhone or iPad into a master clock—with adjustable swing—by connecting its headphone out to any Volca's sync input, it also provides WIST integration between the Volcas and Korg's iPad synths. Let's look at each Volca in more detail.

Volca Beats

The Volca Beats' sequencing tools are intuitive if you've ever used a hardware drum machine. You can tap in patterns in real time, with sixteenth-note quantization baked in (and impossible to turn off). If you're a fan of step sequencing, you'll love the vintage TR-style interface for programming grooves one drum at a time.

The first thing that grabbed me about the Volca Beats is that it *feels* retro, reminding me somewhat of a Roland TR-909. Like the 909, the Volca Beats is a hybrid drum machine. That is, some sounds are generated via analog synthesis while others are sample-based. This gives the unit a very distinct sound that covers a lot of ground.

The analog side focuses squarely on kick, snare, a pair of toms, and closed and open hi-hat. Vintage fans familiar with the TR-808 sound will be in heaven here, considering that the kick and snare feature nearly identical tone-shaping features and sound quite similar.

The kick includes three parameters: Click, Pitch, and Decay. From tight, clicky, electropop taps to gargantuan subsonic hums suited to hip-hop and drum-and-bass music, this kick is an absolute crowd pleaser.

The snare features three similar adjustments—Snappy, Pitch, and Decay—making it quite versatile. The core sound is a short, tom-like tone which can be tuned with the Pitch knob. The Snappy knob adjusts the volume of a noise-like component, while Decay governs the overall duration. Personally, I preferred the snare to have lots of snap and a short decay, but if you lower the Snappy parameter to minimum, you can use the snare as a third tom or conga, which is great for subtly melodic grooves.

The dual toms include Pitch for each and a Decay parameter that affects both. These elements absolutely nail that early Roland sound, including the CR-78 and TR-808, and of course, the classic Korg KR-55.

The open and closed hi-hat feature individual Decay knobs for dialing in everything from percussive ticks to those long-ringing ride cymbals. There's also a Grain knob that "tunes" the metallic

aspect of the hat. At medium to high levels, everything sounds fittingly familiar. At its lowest settings, there's a dirty electronic flavor that's well suited to IDM and experimental styles.

On the sample-based side are four sounds: clap, clave, agogo, and crash. Each can be independently tuned via the Volca's PCM knob, and the tuning range is absolutely massive. When set near the middle, each drum sounds appropriate (though the crash sounds more like a human breath than anything resembling a cymbal). At extremely low tunings, the sounds get nasty and bit-crushed—perfect for industrial flourishes. At the top of the range, you get clicks and taps that are fantastic for tech-house top loops.

The Volca Beats includes a stutter effect that's actually much closer to a delay than it is to Ableton's Beat Repeat or iZotope's Stutter Edit, but I'm splitting hairs here. In practice, it's handy for a wide range of effects from tight room reverbs to reggae dub repeats, and it can be applied to individual drums or all of them as a whole.

Once you've whipped up a one-bar groove via either playing or step entry, you can manipulate it in musical ways. To tinker with the sequence itself, you can use the innovative Active Step and Step Jump options, which toggle steps on or off on the fly. Among their many uses is quickly switching from a driving half-bar loop to the full measure and then back. The caveat is that these realtime tricks can't be recorded.

Several other performance moves *can* be recorded. The stutter effect knobs can be played in real time and embedded into your sequence, either globally or on a single drum. Twists of the PCM Pitch knob can be recorded for each of the sampled drums individually. Personally, I loved this option, as it allows for either Kraftwerkian rising patterns or swoopy Sebastien Léger weirdness.

After a few days of playing with the Volca Beats, I had the basis for an entirely new track *and* a bunch of techy top loops for adding to some of my existing projects. When a product immediately becomes a part of my workflow, I know I have a winner on my hands.

Snap Judgment

IN COMMON

PROS Real analog synth engine. Multiple Volcas can sync via Monotribe-compatible voltage clock. Battery power option. Huge bang for buck.

CONS No MIDI output. No shuffle/swing. Headphone jack is the only audio out.

VOLCA BEATS

PROS Rich and meaty drum sounds, both analog and sample-based. Integrated stutter effect. Sample pitch and delay parameters can be automated.

CONS Some of the sampled drums could stand to be louder.

VOLCA KEYS

PROS Very warm, punchy synth sounds. Tons of knobs for realtime tweaking. Three-note polyphony in certain modes. Integrated delay and ring mod.

CONS Playing polyphonic riffs on the touch-panel keys is a bit tricky.

VOLCA BASS

PROS Brings the vibe of the coveted TB-303 into the 21st century. Three simultaneous note patterns in each groove. Oscillators can be stacked for triad riffs.

CONS No parameter automation. Steeper learning curve than the other two Volcas.

Volca Keys

From the sheer number of knobs covering the front panel, it's clear that despite its tiny size, the Volca Keys is a serious synth. It's polyphonic, to boot.

The touch panel is a 27-note (*F* to *G*) chromatic keyboard for inputting your sequences. In a studio, I'd recommend using a full-sized keyboard via MIDI as this really makes the synth come alive, but the touch panel does the trick for mobile composition. The white keys do double-duty for accessing sequencing features and a few LFO parameters.

Programming sequences into the Volca Keys is pleasingly straightforward. There's even a metronome. Unlike with the Volca Beats, you can turn off quantization (Flux mode in Korg parlance) if you have a riff that's more fluid than a standard sixteenth-note pattern.

The Volca Keys' oscillator controls deliver a ton of sonic variety in a very direct manner. For starters, a six-option knob changes the overall oscillator configuration. The "Poly" position puts the unit into single-oscillator mode with three independent sawtooth voices sharing the same filter. "Unison" stacks all three oscillators for big detuned leads. "Octave" and "Fifth" give you a pair of detunable sawtooth waves with the top note an octave or fifth up. The other two modes offer ring modulation, with "Unison Ring" delivering a Volca version of that Minimoog square wave lead and "Poly Ring" a single-oscillator square that dissolves into madness when additional notes are played.

Each of the six modes interacts with the VCO detune knob in various ways, ranging from subtle thickening to atonal mayhem, especially in conjunction with the ring mod modes. The VCO section also includes a portamento and envelope depth controls.

The Volca filters are based on the ultra-rare MiniKorg 700S, which gives them a flavor that's a bit different from the Monotrons and the MS-20 Mini. It's still a two-pole, 12dB-per-octave affair, but with a more aggressive resonance.

As to modulation, the Volca Keys includes all of the essentials, including an ADS envelope (decay and release are tied to one knob) and an LFO with saw, triangle, and square waves that can modulate both pitch and cutoff with separate amounts for each. The LFO also includes a nifty trick from the Monotribe: You can set it to retrigger with each event, which means that at slow rates with a sawtooth or triangle wave, it can be used as an extra pseudo-envelope. Nice touch.

Like the Volca Beats "stutter" effect, the Keys version includes an integrated delay with independent control over time and feedback. Even though it's a digital delay, there's something warm and crunchy about it, like an old-school rack unit. With extremely long times, the highs get duller in a very musical way and with shorter times and high feedback, you can hear a touch of sample aliasing. Purists might complain, but you can always run the Volca Keys through an outboard effect. For my part, I'm glad that Korg left all that crunchy character in place.

Automation is where the Volca Keys blew me away. Every knob, except resonance, oscillator mode, octave and tempo, can be automated and recorded—including the delay parameters. Since the Volcas only support one-bar sequences, that means wiggly, morphing grooviness is baked right in. Little filter moves, LFO sweeps, and bits of delay are a piece of cake and fun to use. This makes the Volca Keys capable of some truly interesting riffs that are absolutely dance floor ready.

As a MIDI synth, the Volca Keys is a fantastic addition to a bedroom studio, and the three-voice polyphony makes it the most affordable analog polysynth for the foreseeable future. As a groovebox, it's irresistible for everything from synthpop to bangin' electro, especially with its ability to automate nearly every parameter. Overall, the Volca Keys' sonic scope is astonishing.

Volca Bass

With its brushed aluminum front panel and overall knob styling, the Volca Bass is reminiscent of the legendary Roland TB-303, with the notable enhancement of having up to *three* synchronized note sequences playing simultaneously through its filter and envelope—a serious advantage for getting complex synth patterns out of a single box.

It is a bit difficult to get the hang of inputting

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sequences. If you devote an evening or two to experimenting, with the manual in front of you, it can be thoroughly mastered. But with so many of its tabs serving double duty, up to three discrete note sequences running at once, and (unlike the Volca Keys) no metronome, things can be a little confusing at first. On the other hand, one of the coolest things about the Volca Bass is precisely that it's not entirely predictable, especially when you add in the ability to slide your finger across its key tabs as though they were a ribbon. This makes those classic "acid" riffs a heck of a lot easer to whip up than on a 303.

The Volca Bass can also stack up to three oscillators on a single note. Each oscillator includes a choice of square or sawtooth, with a dedicated tuning knob that works as a detune function between 10 and 2 o'clock, plus semitone tuning (up to 12 steps in either direction) outside that range.

If you don't want to stack all three oscillators on a single riff, two alternate options separate the oscillators in unusual ways. One mode stacks the first two oscillators on a single sequence, for detuning effects or interval riffs like major thirds or fifths. The other, mentioned earlier, lets all three oscillators work independently, including their tuning, waveforms, and note sequences. This is just massive bang for buck.

The rest of the synth engine is quite simple, with a resonant lowpass filter processing all three oscillators. Vintage synth fans take note: Like the Volca Keys, this filter is based on the MiniKorg-700S, not the TB-303, so while it's very capable of screeching acid resonance, it's not meant to be an exact clone of the Roland sound. Still, it sounds wonderfully aggressive.

For modulation, an LFO can be routed to pitch, amp, or cutoff. You get a basic attack-decay envelope with switchable sustain (release and decay are tied, like on a Minimoog). The envelope can also modulate the filter cutoff, naturally.

Unlike the Volca Beats and Volca Keys, the knobs on the Volca Bass can't be automated within a sequence. If you want the Volca Bass to play evolving modulated riffs without twisting knobs yourself, the LFO does a great job when set to a moderately slow rate and applied to the filter.

By turning all three oscillators on, then tuning each to a different note interval, it's ridiculously easy to create parallel chord stab riffs. Tune them to a minor triad with a short filter envelope, and you've got instant Detroit techno. Big fun indeed.

Of the three Volcas, the Bass requires the most commitment. "Intuitive" is not a word I'd use here, but the same has been said countless times about the TB-303, which is still one of the most sought-after vintage synths out there. The Volca Bass doesn't sound exactly like a 303, but it does share the same soul—only with three times the brains. That makes it one of the most exotic sounding analog groove synths ever made. ♫

Bottom Line

Korg resurrects the groovebox three ways, each with the biggest bang for buck we've ever seen in real analog synthesizers. All are Key Buy winners.

$182.99 list | $149.99 street (each)
korg.com

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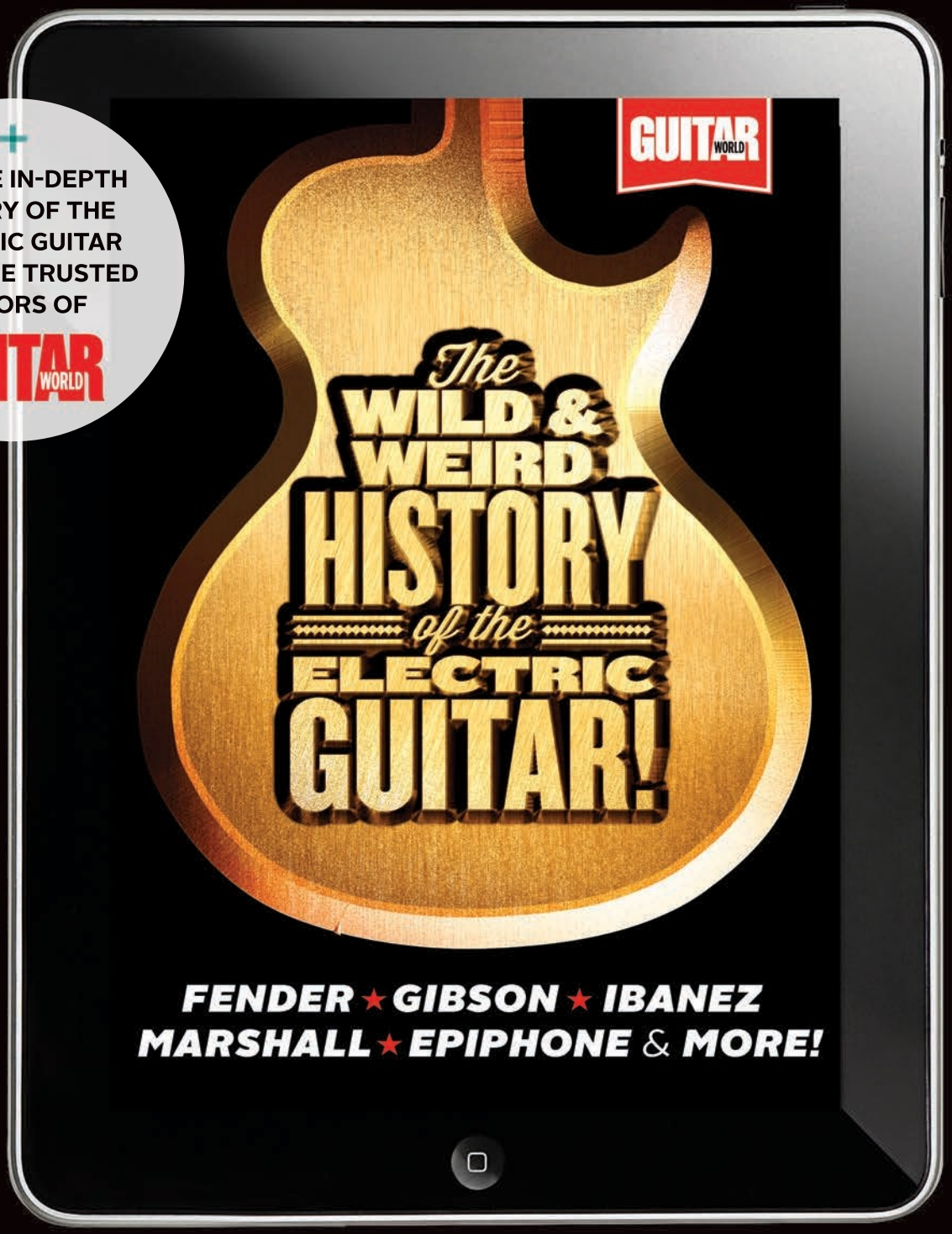

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NATIVE INSTRUMENTS

Maschine Studio and Maschine 2.0

BY PETER KIRN

IT'S BEEN FOUR YEARS SINCE NATIVE INSTRUMENTS MASCHINE BURST ONTO the scene as a true hybrid tool in which hardware and software were developed in tandem. Since then, it's become almost second nature to expect hardware/software combos that sequence patterns and manipulate samples. From the software side, Ableton has developed Push (reviewed Jan. '14) as a hardware companion to Live. From the hardware side, Akai's MPC Renaissance (reviewed June '13) trades the legacy standalone drum machine for a massive controller run by computer software.

Now, NI unveils their next generation. Maschine Studio is the flagship of the company's fleet of computer music production tools, and hopes to be your go-to workstation for groove-making. There's a ground-up rebuild of the software, loads of new goodies packed in the box, and the expansive, top-of-the-range controller. This review covers both the Maschine Studio hardware and

Maschine 2.0 software (which works with the entire family of Maschine controllers).

Overview

At its heart, Maschine is exactly what it looks like: a beat production workstation with its roots in classic sampling drum machines like the MPC60. But by combining a tactile workflow with software and Native Instruments' vast soundware libraries, it's also a window to your computer's open-ended sonic capabilities. It runs on its own if you prefer, or in hosts such as Ableton Live and Avid Pro Tools (with AAX, VST, and AU formats all supported).

As before, you get sampling, slicing, groups and scenes, effects and mixing, and arrangement features across hardware and software, and the hardware also doubles as a MIDI controller. The Maschine 2.0 software doesn't do anything fundamentally new, but it does everything better. It adds a broader range of sound features, and makes everything easier to access, easier to play, and faster and more responsive.

Software

Native Instruments emphasizes that there's an entirely new sound engine. That yields various optimizations, the most significant being thorough multi-core processor support. The differences are immediately apparent: The CPU meter creeps up much less quickly, even in big projects, and projects and sounds are far quicker to load. Those load times also increase Maschine's appeal as a host for Native Instruments' Komplete sound library. Audio quality is also improved, though the changes are subtle.

You can spot the new user interface from across the room. The look is cleaner and more spacious (see Figure 1). It looks so different, in fact, that Maschine 1.0 users may be surprised to discover that they mostly know where everything is. Where NI has moved UI elements, it's mostly been to improve access. It's clearer now how to audition sounds and explore the interface, and the less-cluttered UI is far easier on the eyes. Relevant functions are consolidated on the transport bar, and it's easier to navigate spatially by pads. There's also a new browser (with tags) and a useful pair of icons that swaps you between NI's factory content and your own custom libraries.

Best of all, there's a new Mix view. Finally, you can see an overview of the levels and routings of your groups, including a new plug-in strip. You can set up a dedicated Cue bus for pre-listening, which is ideal for recording or live performance. The view

Fig. 1. The redesigned UI features a new mixing overview, cleaner controls, and an all-new browser equipped with tags for finding sounds quickly.

MASCHINE 2.0 CONTENT

A hundred bucks seems reasonable for upgrading to all the new functionality, but NI bundles in even more in the form of included content. There's gigabytes of new soundware, plus the amazing Reaktor Prism instrument, the Scarbee Mark I electric piano, and the beautiful Solid Bus Compressor. That's on top of Massive, the soft synth already made available free via the Service Center licensing app. Just remember, you're a *Keyboard* reader—if you play the Scarbee from the pads rather than tickling the ivories, please don't tell us or your piano teacher about it.

Snap Judgment

MASCHINE STUDIO CONTROLLER

PROS Beautiful dual color screens. Loads of hands-on control. Easy visibility of arrangements and waveforms in color. Three MIDI out ports. Great feeling pads as on previous Maschine hardware.

CONS Large size limits mobility for backpack DJ rigs. No built-in audio interface. USB power not an option; requires AC supply (included).

MASCHINE 2.0 SOFTWARE

PROS Makes powerful beat-making faster than ever. Lower CPU usage and speedier performance. Great-sounding, flexible drum kit models. Unparalleled bundled sound value. Improved Groups, effects, routing, and cueing.

CONS Mixer view makes managing levels and routing easier. Easier recording. Slick, clean user interface. Works with all previous Maschine hardware.

Fig. 2. Dedicated drum synths model analog and digital classics, with switchable sound engines. There's also new MIDI learning for control assignments.

is more flexible, but so is the routing under the hood—at last, you can sidechain both internal and external VST and AU plug-ins. Now, if NI would only add some interactive help, as what some of the icons do isn't immediately obvious.

Maschine 2.0 is otherwise more of the same, in a very good way. You get more Groups and effects: Each is now unlimited in number (though each Group is limited to two aux sends). And you get a lot more sounds. There's a set of modeled drum synths as well as more general Percussion. Each of these, in turn, comes with its own set of selectable sound models, ranging from emulations of vintage analog synths to newer digital instruments. ("Fractal" tom, anyone?) The combination of parameters and engines means a wide range of possible sound beyond the already-extensive sampled library in Maschine (see Figure 2).

There are also more effects, including a lovely plate reverb (a must-have addition to Maschine's already brilliant reverb collection) and a feedback mode on the compressor.

Recording and editing is vastly improved. You can now undo by either step or take, choose what sound the metronome makes, and gate recordings in Note Repeat mode. In fact, recording quick takes on the pads is really a strong suit in Maschine 2.0; it should make any finger drummer smile. If you hold down the Record button, you can quickly choose the length and grid of the pattern you're about to record, plus the metronome settings. Hold down the Shift and Grid buttons, and you can set up metronome, count-in, and input quantize settings. Count-in is also more adjustable.

Improvising quickly is stunningly easy. Unfortunately, arrangement after the fact remains a weak spot, meaning you'll still likely migrate to a DAW when it comes time to finish your tracks. You still can't live-trigger scenes to improvise an arrangement (as you can in Ableton Live), and the arrangement itself still involves assembling scenes and patterns as simple building blocks. You can sample, but you can't record audio in "freewheel" fashion (as with a vocal), or see a preview of waveforms. The workaround remains to use Maschine as a plug-in inside your DAW of choice. But while it wouldn't makes sense for Maschine to *be* a DAW, it would be nice if the arrangement tools didn't feel quite so limited, particularly in contrast to other areas of the software.

That's not to say that arranging was entirely neglected. Finally, the display at least follows the currently playing position. And on the Maschine Studio unit, arrangement is much easier to see on those beautiful color displays. But it'd still be nice to see this area of the program fleshed out.

Another area that could use improvement is MIDI integration. On the plus side, the 2.0 software adds the ability to assign MIDI controls and host automation to Maschine parameters, import MIDI files as patterns, and use MIDI program changes with plug-ins. But while Maschine Studio now has a whopping three MIDI out ports, you still can't either record or play back MIDI continuous controller (CC) data. That's something any self-respecting drum machine has been able to do since the 1980s, and it holds Maschine back somewhat from being a true studio hub.

Perhaps the most frustrating omission is that you can't perform realtime audio stretching. Sure, a lot of Maschine users combine it with Ableton Live. But while sample editing is more accessible on Maschine than Ableton's Push, it's very odd that Maschine is incapable of all the remixing and audio-warping feats of NI's Traktor software. Add those features, and Maschine could become a live DJ staple.

Still, that's no reason to be down on this upgrade, which is simply enormous. Plus, the reason we've talked talk about software before hardware is that version 2.0 works with all previous Maschine controllers for just a $99 upgrade. Native Instruments could have leaned on its customers to buy the new hardware, but they didn't. Maschine 2.0 is better, bigger, and faster without disorienting you about where things are or how they work, and after four years, it's the first paid upgrade. That's a tremendous value.

Hardware

So, now you know you don't have to buy the Maschine Studio hardware to get a stunningly powerful workstation. What do you get if you *do* buy it?

Maschine Studio is probably the best looking hardware NI has ever made. In black or white, it's simply gorgeous. It's also clearly the SUV of the family. At 17 inches wide, it's significantly bigger than past controllers, and it's tough to fit into just about any laptop bag—ditto for small DJ booths that are crammed full of the venue's equipment. [*If you're used to carrying keyboard instruments, though, Maschine Studio is still more Vespa scooter than SUV. —Ed.*] Also, USB power won't drive all the bells and whistles, so there's an AC supply. That said, it's surprisingly light—the plastic feels rugged and premium, but the whole package weighs just over seven pounds. You can also angle it towards you with two solid-feeling, snap-out stands that are embedded in the base.

The center of Maschine Studio is essentially identical to the Mk. II unit. It has exactly the same pads with the same feel and multi-colored backlights, and a nearly identical control layout. That's good, because upgraders won't have to re-train their muscle memory.

The big addition is multiple displays. Two large, 480 x 272-pixel color displays are crisp and bright, even in the age of the iPad. These make a significant difference in workflow and the overall experience. You can now view waveforms, patterns, and scenes in vivid detail. You can see color-coding in the arrangement. You can use the Mix view right on the hardware. And because there are two displays, you can see an overview on the left and details on the right—that's enormously powerful when editing waveforms, for instance. You also get splashy images for all of

Fig. 3. Three MIDI out ports let you augment Maschine Studio's sound resources by controlling hardware synths from its groove-oriented interface.

NI's factory sound libraries, though this is more cosmetic than essential. It seems likely these displays will see even more uses in future versions.

The extra real estate is put to good use in other ways, too. The screens are nice, but the Maschine Studio feature I miss the most when going back to the original or Mk. II hardware is probably the large LED level meter. There are also dedicated edit controls that save you all the Shift-press finger twists, and a beautiful jog wheel that seems to have been designed by the special effects team from the movie *Tron*.

Around the back, you get three MIDI outs and two footswitch inputs (see Figure 3 on ppage 54). What you don't get is any audio interfacing. That's really too bad, as its presence would make Maschine Studio a stronger choice for someone on the road who wants to pack light. Even the addition of a couple of balanced 1/4" TRS outputs would be all you'd need for a wide variety of live gigs. NI shoehorns perfectly good audio interfaces into inexpensive DJ controllers and iPad accessories, so leaving one out here seems odd.

Bottom Line

This hardware/software hybrid focused on beat production is more competitive than ever. The Maschine Studio unit offers luxurious control at the cost of a relatively large footprint, but the 2.0 software also brings huge improvements to Studio's more compact siblings.

Maschine Studio: $1,099 list | $999 street (includes 2.0 software)
Maschine 2.0 software upgrade: $99 for existing users
native-instruments.com

Conclusions

We could talk about feature sets and workflow all day. In the long run, a production tool like Maschine is about finding something that increases the pleasure of making music. There, Maschine remains a spectacular choice. It strikes an ideal balance between what's tactile under your fingertips and what's onscreen, somehow besting both dedicated hardware and standalone software when it comes to basic beat-making tasks. It makes creation truly addictive in a wonderful way.

There isn't anything else quite in Maschine's category. Ableton Live is still a better DAW (Maschine isn't really trying to be a DAW), and Ableton Push learns the tactile lesson that the first generation of Maschine taught. But there's a reason so many people use both: Maschine is nicely focused on tried-and-true sample-based workflows without being a whole DAW. And while Akai's MPC Renaissance hardware is formidable (it includes audio interfacing, for one), the software doesn't show the same refinement and breadth as Maschine.

Does Maschine deserve our Key Buy award? No question. The question is, which Maschine? If you've got the budget and you intend to leave it in your studio (as the name implies), or don't mind carrying it plus an audio interface, Maschine Studio's dual screens and added controls are the height of groove-production luxury. But Native Instruments has done such a good job making Maschine 2.0 work with its earlier hardware that the Mk. II remains the best balance of mobility and cost. Maschine Studio is brilliant for those who want the extra visual feedback and control, while the version 2.0 software makes any earlier Maschine hardware feel like a new instrument all over again. ♫

KURZWEIL Artis

BY DAVID BRYCE

IN THE EARLY '90S, KURZWEIL TURNED THE KEYBOARD MARKET ON ITS EAR with the PC88: an affordable, portable 88-key stage piano that quickly became the go-to instrument for gigging keyboardists everywhere, including me. Now, Kurzweil has introduced the Artis, their latest stage piano-meets-all-around gig keyboard, featuring a highly anticipated new piano sample. Obviously, expectations are high. Will it turn as many heads as so many of their other offerings have done?

Overview

Basically packing all the processing power and the entire sound set of Kurzweil's flagship PC3K8 (reviewed Jan. '11), the Artis offers a new streamlined interface designed to deliver easy access to all the sounds and features sought after by keyboardists looking for a "bread and butter" instrument.

Program navigation uses a large scroll wheel and Previous/Next buttons, or 16 Category buttons, each of which has 16 individual Program buttons that do double duty for alphanumeric data entry. Double-pressing the Program buttons on the bottom-most row allows access to MIDI program change, ROM-play demo tunes, and a very nice feature called Program Demo that plays a short phrase showing off how the designer who programmed each sound intended it to be used.

Nine sliders and five assignable buttons deliver realtime control over all sorts of useful parameters that vary per Program. Four more buttons toggle zones on and off. A three-band master EQ is located by the volume slider, providing high and low shelving as well as sweepable midrange. Dedicated transpose buttons are above the pitch and mod wheels, along with a Variation button that changes function depending on the program, such as kicking in a pad or adding an effect. Under the display, six soft buttons do different things depending on the unit's mode. Under those, ten more buttons provide one-touch access to Favorite sounds.

The Artis sports the same hammer-action Fatar TP-100 keybed used in the SP4-8 stage piano. It's smooth, and faster for playing non-piano riffs than many weighted actions, at the trade-off of not feeling quite as solid as the TP40L action used in the PC3K8. As implemented in the Artis, the action doesn't transmit aftertouch.

Architecture

The Artis is loaded with sounds selected from onboard wave ROM of the PC3K, the KB3 organ engine, and the Kore64 expansion ROM (reviewed Sept. '13) for the PC3 series. This provides what might be the most widely varied sonic palette of any stage piano to date: 256 Programs organized into 16 banks of 16 Programs each. Another 256

Snap Judgment

PROS Brand new 128MB German grand piano. Extremely powerful VAST engine. 128-voice polyphony. Best voice-stealing algorithm in the industry. Killer vintage keys and non-piano sounds.

CONS No access to primary programs when split/layer is engaged. No recording/playback of audio files via external flash drive. No onboard drum patterns. No aftertouch.

The back panel is home to two footswitch jacks that can take either single conventional pedals, TRS pedals that support half-dampering for piano sounds, or double pedals. A separate jack is for a continuous control pedal. USB jacks are provided for both computer connectivity and thumb drive storage of Program data. The 1/8″ stereo input is for routing a music playback device to the outputs. The headphone jack is around front, below the pitch and mod wheels.

Bottom Line

Everything Kurzweil PC series fans love plus a long-awaited new piano multisample, wrapped up in a gig-oriented interface.

$2,895 list | $2,195 street
kurzweil.com

slots are for saving your own, but editing you can do onboard the Artis is limited to storing variations within the parameters that Kurzweil pre-assigned to a given Program's controllers. A free software editor (available at kurzweil.com/product/artis/downloads) makes virtually every parameter in the machine available for editing.

Any four programs can be split and/or layered across the keyboard into Multis; as with Programs, you get 256 factory presets and 256 user memories. You can also load in any PC3 program.

In Program mode, the Artis can be split and layered using the soft buttons under the display. This calls up a secondary program, which can be changed and tweaked as if in Program mode—but the only way to access the primary Program is to cancel the split/layer. Also, activating a split or layer sets the first two sliders to control the volume of both the primary and secondary program; however, you have to move them to the full volume position before they'll engage. In Multi mode, the first four sliders control the volume of all four zones, and each zone can be toggled on and off using the buttons found above each of these sliders. Whenever a slider is moved in Program mode, the parameter that it controls is reflected in the display, so you don't have to guess what the sliders do in any given context. Considering the myriad of realtime options available given the VAST engine, this is a really nice touch. As with the PC3, the first couple of sliders typically control filter cutoff and resonance, and the last few control effects such as reverb depth and delay time.

All the effects found in the PC3K's formidable engine are in the Artis, but only those chosen by Kurzweil for each Program can be used, and again, onboard editing is limited to changing values for pre-assigned parameters. Multi mode gives you more control over effects chains, but you'll still want the free editor software for deep customization.

In Use

Being a diehard Kurzweil fan, I was eager to hear the Artis' new "German Grand" piano sample. It's pretty darned impressive, and is obviously an improvement over the triple-strike piano multisample Kurzweil has been using for many years. The sound is rich and full, and the power of the VAST engine and its ability to use up to 32 layers per Program (each one able to be woven in at a finely tuned velocity, and/or key range) has been used very effectively to produce a very realistic and nuanced piano that is clearly superior to anything Kurzweil has yet brought to market. The *fff* piano sample may be a bit strident for some players, but those who like a very dynamic piano that cuts through a mix will probably find it suited to their taste.

The EPs and Clavs are almost all lifted directly from the PC3, and offer a very nice selection of really useful sounds. It's also really cool to have the KB3 organ in a stage piano. In KB3 mode, all nine sliders act as drawbars, and the nine buttons located over the sliders control all the functionality expected in a dedicated drawbar organ: harmonic percussion, vibrato/chorus, key click, tonewheel braking, and more. When KB3 mode is engaged, the Variation button acts as a dedicated toggle for the rotary speaker effect. Although this doesn't beat the better dedicated pedals and clonewheels currently on the market, it sounds better than anything else you'll find in a do-it-all instrument of the Artis' type.

Synth sounds are outstanding. The same goes for pads, which are very warm and great for layering. The 16 string programs are culled directly from the PC3's String ROM, Orchestral ROM, and (for Mellotron strings) Vintage Keys ROM, and sound gorgeous.

There's also a drum bank featuring killer samples and Programs from the Kore64 expansion, but no drum *patterns* are found anywhere in the machine, save for the aforementioned Program Demos.

Conclusions

Keyboardists have been waiting for a new piano sample from Kurzweil for years, and the Artis delivers that and more. Essentially, it's a PC3K8 sound engine (*sans* sequencer) with a different keybed, simpler interface, and the user-loadable 128MB Flash memory replaced by 128MB of piano ROM. If you've been wanting Kurzweil synthesis power but with fresh piano sounds and easier, more gig-oriented operation than the PC3 series, the Artis may be just the ticket. ♫

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Original audio examples.

keyboardmag.com/march2014

NEKTAR

Panorama P6

Keyboard K KEYBUY AWARD

BY ROB SHROCK

IN A CROWDED WORLD OF BUDGET MIDI CONTROLLERS WITH LIMITED FEATURES and questionable build quality, it's nice to have a high-caliber controller that hits most of the marks for the demanding professional. Nektar's P-series aims at this mark, and it both sped my workflow and felt great while doing it.

Overview

The Panorama P6 (61-note) and P4 (49-note, reviewed Feb. '13) have been out for around a year now. A lot of the basics of the Panorama have already been covered, so we'll focus mainly on what's new.

At its most basic, the P6 is a universal MIDI controller with nine sliders, 16 continuous rotary knobs, eight buttons, 12 drum pads with pressure, transport controls, modulation and pitch wheels, and a crisp color TFT screen. Additional buttons are dedicated to Undo, Click, selecting among several operation modes (Mixer, Instrument, Transport, Internal), octave shift, selecting tracks and patches, two assignable "Performance Buttons," and general navigation of the interface and display. Up to four keyboard zones can be assigned, and 20 presets allow for multiple customized setups.

One of the standout features is a 100mm ALPS motorized fader in the upper left corner, along with dedicated Mute and Solo buttons for the selected track. The fader is touch-sensitive, allowing the user to update moves on the fly when DAW automation is active.

I really like the feel of the keyboard. The semi-weighted action strikes a good balance between having enough weight and resistance for piano parts and being fast enough for synth and organ riffs. My only complaints are minor: Organ smears require a lighter touch positioned more on top of the keybed (since the keys aren't the waterfall kind but instead have a piano-like lip), and the keys are mechanically a bit noisy, especially upon the release of the white keys.

Updates

The P-series really shines when paired with one of several applications that have been thoroughly mapped. A lot of the original P-Series integration focused on Propellerhead Reason, as during last year's review of the P4. In Reason, several improvements have been made since then. Hitting

Snap Judgment

PROS Professional build quality. Excellent feeling keyboard, pads, and physical controls. Motorized fader. LED display gives detailed, updated feedback. Extensive two-way integration with Cubase/Nuendo, Reason, and Logic. Function keys can trigger complex DAW macros. Custom mapping of editing parameters for hundreds of instruments and plugins. USB-powerable. Looks great.

CONS Having only 12 physical pads is a compromise for playing 16-pad virtual drum instruments. Keys are somewhat mechanically noisy, especially on white key release.

Have a slab with a great action but not enough controls? The P1 could be your solution. It's missing the drum pads and motorized fader of the P4 and P6, but otherwise it works the same.

a drum pad assigned to Kong, ReDrum, or Dr. OctoRex now automatically pulls up that drum sound for editing. Transport control is improved, and a new "Transport Looper" feature allows various arrays of musical bars to be assigned to pads, making for interesting and spontaneous loop combination experiments. The Panorama can also randomize the parameters in the currently selected menu, a creative touch that could be useful for sound design. Also, the Panorama currently supports mapping for 94 Reason Rack Extensions.

Steinberg Cubase integration features Mixer control of EQ, sends, inserts, and Quick Controls. You can view the eight insert slots and which plug-ins are available for editing, including all page and menu parameters. The same goes for Cubase instruments. As of this writing, 347 VST plug-ins and instruments have been mapped, with more on the way—see Nektar's website for the full list.

In Use

I put the P6 to the test on a duet track I'd been working on for Jill Scott and Dionne Warwick. Having just relocated studios, most of my gear was still in cases, so I had to work "inside the box." The Panorama sports nine sliders instead of the usual eight, which will make virtual organ players happy. With the P6 in Internal mode (acting as a universal controller), I quickly mapped the sliders to the drawbars in Logic's Vintage B3. While I was at it, I assigned six of the buttons and two rotary knobs for vibrato/chorus, distortion, and percussion settings, and was recording five minutes later.

I was able to test out a beta version of Nektar's new Logic integration template, which should be released by the time you read this. Though incomplete and still showing a few bugs at the time, I was really impressed with how much my workflow immediately improved.

After performing the necessary firmware update and beta Logic template install, things really opened up. Using my large MIDI template for strings, it was a joy to record the numerous tracks on the P6. I'm a big fan of pitch-bend and mod wheels as opposed to a joystick, especially for modern sample libraries that rely heavily on MIDI CC 1 for dynamic control. The combination of the keyboard response, mod wheel, and expression pedal felt great while recording delicate string lines.

After getting all the string parts in, the individual tracks needed to be balanced within each section and as a whole, which is tedious if you use just a mouse. The P6 addressed the individual tracks in banks of eight. The sliders have a smooth, controlled throw with just enough firmness (there is some left-to-right wiggle, though). The Toggle/Mute button cycles the buttons below through mute, solo, and record-arm functions (all light up when engaged), while the top row of knobs defaults to panning. Having all that control available at once felt like having a small console at my fingertips and made balancing the individual parts a breeze.

Once I'd achieved the initial balances between my string tracks, I put the motorized fader to good use writing the automation of the string bus against the rhythm track (the sliders can be used for this task as well, they just don't move automatically). Having a dedicated set of Mute and Solo buttons next to the motorized fader is a nice touch. The motorized fader is a bit noisy mechanically when following busy fader moves and I wouldn't say it rivals an SSL console in feel, but it's every bit as good as most of the standalone DAW control surfaces that are out there.

Conclusions

The Panorama hits almost all of the marks I look for in a MIDI controller: nine sliders instead of eight; a healthy supply of knobs and buttons, useful drum pads with pressure sensitivity, wheels instead of a joystick, dedicated transport and octave-shift controls, sustain and expression pedal inputs, and a logical layout. The keyboard feels great for most playing situations, and the build quality is excellent for both studio use and touring.

Nektar has shown a dedication to expanding the tight integration with the most popular DAWs, plug-ins, and virtual instruments, which makes the Panorama all the more powerful. And for those who like to customize their MIDI control setups, the P6 won't disappoint. The built-in motorized fader, time-saving function key macros, and visual feedback about parameters go beyond most other MIDI controllers and place the Panorama among the elite. The price at which it delivers that performance makes it a Key Buy.

Bottom Line

A sophisticated, feature-rich, and well-built MIDI controller designed for the discerning professional, yet still affordable.

P6 (61 keys): $650 list | $599 street
P4 (49 keys): $599 list | $499 street
nektartech.com

See It Now!

Read our previous review of the Panorama P4.

keyboardmag.com/march2014

NATIVE INSTRUMENTS
Razor 1.5

BY FRANCIS PRÈVE

Keyboard K KEYBUY AWARD

WHEN I REVIEWED THE ORIGINAL 1.0 VERSION OF NATIVE INSTRUMENTS' Razor back in 2011, I was absolutely blown away. While the synth was marketed at dubstep producers—now morphing into "bass music" producers given recent trends in EDM—it was far more than just a "wub-wub" generator. As a high-concept software synth, Razor blends additive synthesis with familiar subtractive and virtual analog concepts in a way that makes it both approachable to newcomers and an extremely powerful educational tool for learning the essential concepts of synthesis itself. I intend that as high praise, as I teach electronic music production to college students.

Signal Path

For those of you who missed the original review, here's a synopsis of Razor. Unlike many other additive synths, Razor's architecture closely resembles a standard two-oscillator analog-style synth, with each oscillator feeding its own "filter" module. Following the oscillator-filter pairs is a series of three "effects" that rely on direct FFT-like manipulation of harmonics and related frequency components. While these may *sound* like standard processes like reverb, chorusing, and such, they're generated entirely within the additive domain, giving them a certain kind of flexibility and presence that traditional time-domain effects don't quite match.

Some artists skip over additive synthesis because it's so insanely deep. If you don't know exactly what you're doing, you'll often end up with sounds that are crystalline and bell-like, or that sound like vocal formants. Both are quite easy to achieve using additive synthesis, but they're not everyone's cup of tea. Razor's approach to additive oscillators bypasses those common pitfalls by

Snap Judgment

PROS Powerful and unique additive synthesis tools in a familiar subtractive synthesis interface. Innovative FFT-style display shows users exactly what's going on inside each synth module. New processing tools expand Razor's usefulness immensely. Fantastic educational tool.

CONS All this additive power is a bit CPU intensive.

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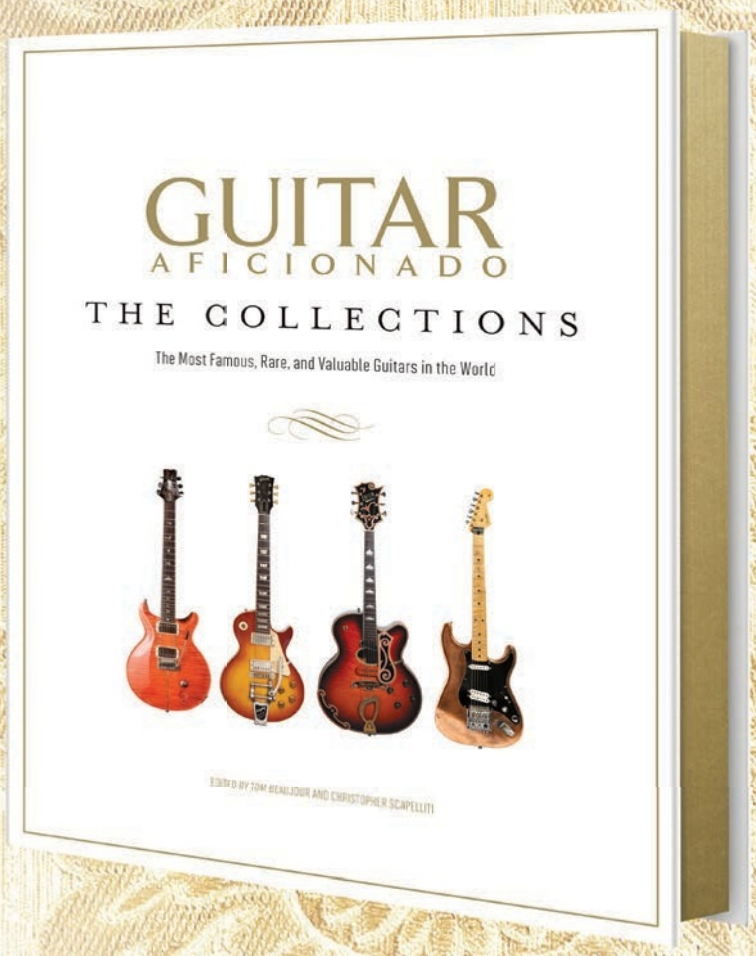

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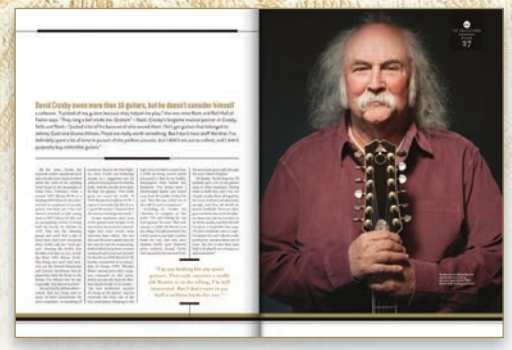

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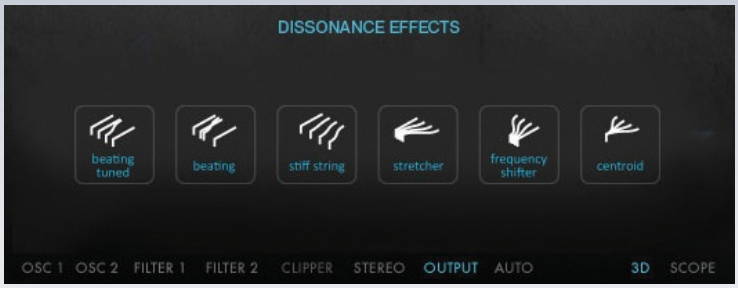

This Razor module may be called Dissonance, but its macros can produce some very musical results.

providing a wide variety of different modes that are controlled via easy-to-understand macros. For example, the first oscillator mode allows users to morph smoothly between sawtooth and square waves by directly controlling the volume of the even-numbered harmonics, with ample visual feedback so you know exactly what's going on with the frequency content. Other oscillator modes focus on morphing tricks like octave harmonics shifting to sawtooth harmonics or manipulating prime-numbered harmonics (which sounds uncannily like a harmonica, interestingly). Of course, there are also modes that deliver those trademark shimmering glass-like sounds, but with 14 options available, it's remarkably easy to get exactly what you're looking for without needing a math degree.

Razor's filter modes are equally useful and often shockingly exotic, even when given a standard sawtooth wave to process. Filter 1 includes five different lowpass modes, each tailored for different textures, while remaining familiar to anyone who's delved into analog synthesis. The two standout lowpass modes are "Phaser" and "Dirty." Phaser mode delivers a highly customizable barber-pole phase-shifted effect that I've never heard before. Dirty mode will put a smile on fans of the TB-303, without sounding *anything* like the original. The other six filter modes work their magic on formants, vowels, and even vocoder effects. Filter 2 offers completely different options, including the standard multimode fare along with some unique processes that have names like "Waterbed" and "Gaps." A particular favorite here is "Unisono Noise," which does the classic stacked oscillator trick but with a customizable flavor that, again, is unlike anything I've ever heard in a soft synth.

Following the filters is Razor's trademark Dissonance module (see screenshot above), which applies intelligently designed mathematical transforms to the harmonic output of the main synthesis tools. These defy description, frankly, and are fantastic for risers, transitional effects, and of course, those classic shimmering crystal textures—but again, these rely on intuitive macro control and jaw-dropping visual displays that make it extremely easy to understand exactly what's going on inside Razor.

The final two modules head back into more familiar territory, with the stereo effect module delivering reverb, auto-panning, and chorus options and the dynamics module offering compression and limiting, along with a new mode called "Rectifier" that sounds like no fuzz box you've ever heard before.

As for modulation, Razor includes three ADSR envelopes and two LFOs that you can apply to pretty much any parameter in the synth. There's also an insanely great tool called Echosteps that gradually reduces the value of a given parameter in tempo-synced chunks, transcending what we normally call "echo" to offer highly creative rhythmic effects that would be hard if not impossible to duplicate by other means.

What's New

Visually, Razor hasn't changed much, which is a great thing since it's so intuitive to explore. The additions in version 1.5 focus on added modes for each of the modules, a slew of new presets that highlight these new features, and tight integration tools for NI's Maschine 2.0 groove platform (reviewed with Maschine Studio on page 50).

The majority of the new modes are focused on Razor's Dissonance module. This takes the output of the filters and then performs unique transforms to the mathematical relationships of the frequencies using multiple macros. Sounds heady, I know, but the end result is highly musical. Some of the highlights are Semitone Spacing, which morphs the frequency spectrum into direct correlations to, yep, semitones. Another standout is Noisy, which moves the pitch of the processed frequencies individually via what *appears* to be a random LFO. At slow speeds, it imparts a wobbly effect. At faster speeds, it sounds a lot like noise is being added to the signal. Other new goodies, like P Grid and F Grid, manipulate clusters of frequencies and sound like a cross between ring mod and resonant spaces.

Speaking of resonant spaces, Razor's Stereo Effects module has a few new modes including Resonant Reverb (which is smooth, but with more ringing characteristics) and Air, which adds motion to the upper frequencies and at extreme settings sounds a bit like a flanger.

As I mentioned at the beginning, all of these processes are displayed graphically in a window above the main parameters. This view can operate in one of two modes. The first displays the individual harmonics or frequencies, while the second mode displays an oscilloscope view of what's going on with the final waveform output. For educators, these displays alone are worth Razor's price of admission, since they reveal exactly what's going on inside the synth. To see it in action makes understanding sound design so much less arcane. In fact, when I demonstrate synthesis principles to my students via Razor, the room invariably has a collective "a-ha" moment. I can't emphasize this benefit strongly enough, especially for newcomers to synthesis.

Conclusions

Last year, I overhauled my entire studio and eliminated a lot of hardware and software that I no longer use all that often. Among the soft synths I kept was Razor, because its combination of immediacy and sheer uniqueness as a synth makes it truly inspirational. It's also the fattest and punchiest additive synth I've ever used. With version 1.5 adding even more features, I'm in sonic heaven. I've never said this before in a review, but I absolutely mean it: Just owning Razor will make you a more informed sound designer. It's a five-star soft synth for around a hundred bucks, and carries our highest recommendation, the Key Buy award. ♫

Bottom Line

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HEAVYOCITY
Aeon Collection

BY JOHN KROGH

Snap Judgment

PROS Creative, expertly produced sounds that manage to bring something fresh to the increasingly crowded market of "cinematic soundware." Impressive sound-shaping controls available from the custom user interface.

CONS Can't create new presets by combining individual sample layers within a single instrument instance.

HEAVYOCITY IS KNOWN FOR TOP-SHELF SAMPLE COLLECTIONS THAT COMBINE production-ready cinematic sounds wrapped up in cleverly designed interfaces that take advantage of the custom scripting options in Native Instruments Kontakt player. Aeon Collection continues this trend, combining two sound libraries that previously were available separately. Both are aimed squarely at sound designers and composers looking for textures, impacts, instruments, and loops that go beyond traditional orchestral fare.

Overview

Aeon Collection comprises two separate libraries, *Melodic* and *Rhythmic*, each of which is laser-focused on contemporary, cutting-edge sounds that would be right at home in any music-for-media production (*e.g.*, TV, film, video games, etc.). Billing *Melodic* and *Rhythmic* as "libraries," however, isn't giving full credit to the level of programmability that's available through their custom interfaces, which put a great deal of realtime tweaking at your fingertips, making these collections more like true virtual instruments in their own right.

Melodic and *Rhythmic* feature essentially the same interface, which is divided into three pages: Main, Trigger FX, and EQ/Filter. From the Main page you can adjust the four master effects: reverb, delay, distortion and the generically named "modulation" effect, which combines chorus and phaser. Many of the presets benefit from multiple master effects, which give the sounds a more polished and finished quality.

Trigger FX are a set of five insert effects—distortion, lo-fi, filter, panner, and pitch modulation—that can be applied instantly during a performance by holding down (*i.e.*, "triggering") specific keys toward the extreme upper register of the keyboard. Heavyocity's *Damage* (reviewed Dec. '12) also features Trigger FX, but Aeon's are more advanced with a set of 32-step sequencers that can modulate a variety of effect parameters. I found the Trigger FX to be a great way to improvise with a particular sound over the course of a cue, adding subtle and dramatic changes to the mix.

Similarly, you can rhythmically gate the audio output in quarter-, eighth-, and sixteenth-note subdivisions to create stutter- and dubstep-like effects. Collectively the Trigger FX and gating options make it possible to tweak and sculpt the sounds in creative ways that take the sample content well beyond its original character.

You can push Aeon even further by cranking the Punish and Twist knobs (available in the main page's center section), which introduce compression, saturation, and an "animated, tone-altering effect that twists the audio," respectively. In practice, it's fun stuff for adding extra grit and edginess.

Fans of step sequencing will approve of the arpeggiator's interface.

Melodic Library

As for the sample content itself, *Melodic* is organized into five sound categories: Hits, Organic, Organic (Arp), Synth, Synth (Arp), and Hybrid. Hits are single impacts and sonic trails that are perfect fodder for stings and transitions. These sounds have been skillfully layered and processed, making it difficult to identify just exactly what the original sources are. Many are low, distorted textures that have a vaguely acoustic quality (*e.g.*, low brass, acoustic piano). Think of the Inception soundtrack or just about any sci-fi action movie trailer from the last year and you'll have a good idea what these hits sound like.

Organic instruments are divided into eight subcategories such as brass, bells, eclectic ensembles, ethnic instruments, and more, and are the most dynamically sampled instruments in the bunch, featuring multiple velocities and round-robin samples. There aren't a lot of Organic presets to choose from relative to the other categories, but what this category lacks in numbers it makes up for in quality. These are some truly evocative, moody textures perfect for jump-starting your creative juices. Many presets combine two or three acoustic sources in unexpected ways, such as the "Cellos-Bowed Cowbell-Piano" and "Glock-B3-Bowed Crotales," to name two.

The Synths category offers the most presets, many of which have been programmed with an ear toward edgy sound design. You won't find any polite pads here, and I mean this as a compliment.

As you might guess, the two Arp categories serve up the Organic and Synths presets with rhythmic and melodic variations created via the built-in 128-step multitrack arpeggiator. ("Arp" refers to that, not ARP synthesizers.) The Arp presets do a respectable job of showing off what's possible, though you might want to program more "conservative" patterns if you're writing music that's not supposed to distract from a scene.

Rhythmic Library

The *Rhythmic* library is arranged in three main categories: Menu Suites, Single Loops, and Three-Loop Combos. I should point out that there are no multisampled kits, nor are the loops of the bombastic percussion variety (for that you'll want to check out Heavyocity's *Damage*). The loops are tonal and primarily synthetic in character, with plenty of brooding pulses, heart-pounding bass lines, and simmering distorted grooves perfect for heightening the dramatic impact of a cue.

Menu Suites map individual loops across the keyboard, allowing you to quickly assemble a rhythmic bed by playing different combinations of keys, while the Single Loop presets present a complete loop mapped across the lower octave of the keyboard for easy transposition, and individual slices mapped chromatically, REX-style, starting the octave above. I especially like this format, as it makes it easy to create variations or entirely new loops by triggering slices in a different order. There's also a MIDI-to-Host function that allows you to drag and drop loops as MIDI performances into your sequencer à la Stylus RMX.

Conclusions

Aeon *Melodic* and *Rhythmic* are impressive collections stocked with well-produced and musically useful sounds that offer something out of the ordinary. Aesthetically, the focus is definitely on cinematic soundtrack and sound design work, although I could imagine some presets working nicely in the context of certain electronic styles.

Heavyocity has gained a reputation for producing premium soundware, and Aeon definitely lives up to this expectation. If either of the two instruments piques your interest, take my advice and buy the entire collection. You'll save a hundred bucks and you definitely won't be disappointed. ♫

Bottom Line

Aeon *Melodic* and *Rhythmic* are chock-full of evocative, expressive, and ultimately usable sounds that will give an immediate injection of inspiration to your sonic palette. If you produce sound design or compose music for media, check it out.

Aeon Collection: $399 street | Aeon *Melodic*: $299 street | Aeon *Rhythmic*: $199 street
heavyocity.com

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keyboardmag.com/march2014

ARTURIA iSEM

BY FRANCIS PRÈVE

Snap Judgment

PROS Spot-on implementation of SEM voice architecture. Sweepable filter curves. Full integration with iOS inter-app protocols. Decent monophonic performance even on an original iPad. Eight-voice mode allows subtle parameter offsets for each voice.

CONS Virtual oscillators don't have quite the aural density of the original SEM.

Bottom Line

Arturia's emulation of the Oberheim SEM, now on your iPad.

$9.99
arturia.com

OVER THE PAST DECADE, ARTURIA HAS DONE A TERRIFIC JOB OF DELIVERING virtual versions of some of the world's most famous vintage analog synths, rightfully earning accolades and endorsements from top artists and journalists. More recently, they've expanded these products into iOS territory with their Minimoog emulation (iMini, reviewed June '13) and now, the Oberheim SEM, aptly named iSEM.

In recreating the original SEM's architecture, Arturia did their homework thoroughly, as always. The little quirks of the oscillator configuration, the continuously sweepable filter curves, the basic LFO and attack-decay-sustain envelopes (release is tied to decay, as on the Minimoog) are all in place, along with quite a few enhancements.

As with all Arturia vintage recreations, there are tons of intelligently designed amenities included with the original synth architecture. If you want to stay true to the essence of the instrument, you can skip these extras, but if you want to really ratchet up the sound, the tools are there. In the case of the iSEM, there's a variable-wave sub-oscillator, a noise generator, an extra LFO with a wider array of waveforms, and some essential effects like overdrive, chorus, and delay, all integrated nicely with the iSEM user interface. There's also a modulation matrix for assigning the LFOs, envelopes, and all of the usual MIDI control sources to almost any parameter in the app.

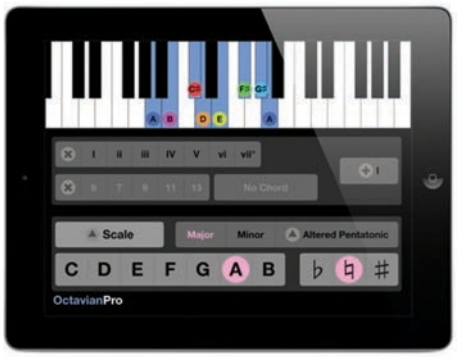
The cherry on the sundae is that the iSEM is eight-voice polyphonic, and in a nod to the original Oberheim four- and eight-voice synths (behemoths comprised of multiple SEMs, a keyboard, and a programming panel in the same chassis), you can slightly offset the parameter values for each voice. Eligible parameters include cutoff, resonance, and tuning, and this facility really helps to recreate the subtle unevenness of discrete analog voices. This goes a long way toward capturing some of the feel of those original Oberheim polyphonic synths.

Beyond the synthesis tools, the iSEM is packed with the most modern iOS amenities, including Apple's new Inter-App Audio connectivity, along with Audiobus, CoreMIDI, and Korg's WIST protocol. This makes the iSEM a true team player in the iOS universe and easy to integrate with your iPad rig.

These bells and whistles, combined with Arturia's deep experience with analog emulation, make the iSEM one of the better virtual analog synths available for the iPad. But the big question remains: Does it really sound like an SEM?

As an artist who owns and uses a modern Tom Oberheim SEM on a regular basis, I'd label Arturia's iSEM as "evocative." Arturia has done a solid job on recreating the SEM's smoothly variable filter modes, which is no mean feat. It also behaves in a manner that's faithful to the original, especially with the ability to tweak the character of individual voices in polyphonic mode. But the overall sound of a single voice just doesn't have the heft and authority of the original analog hardware. It's also worth noting that a real SEM costs around a grand and that's just for *one* voice, so it's a wee bit unrealistic to expect a $10 iPad app to replace that. It's like the difference between looking at video of the Grand Canyon on a new 4K television . . . and standing at the edge yourself. You certainly get the impression of the scale and grandeur from the pictures, but not the actual experience.

That said, I still think the iSEM is a fantastic synth—among the best available for iOS, actually. Its combination of effects, enhanced modulation, and SEM-faithful signal path really puts it over the top in overall usability. So, if you're looking for another analog flavor in your iPad rig, I heartily endorse this app. ♫



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5 THINGS I'VE LEARNED ABOUT Making Living Music

BY AARON PARKS

I DEFINE "LIVING MUSIC" AS MUSIC THAT FEELS UNFORCED, ESSENTIAL, AND emotionally, physically, and mentally engaging. It's a hard thing to describe, but it's the kind of music I care about most. I've come to approach playing by breaking music down via an analogy to the human body. Melody equals voice, rhythm (drums and bass) equals body and heartbeat, and harmony (*e.g.*, piano and guitar) equals mind. The times that I enjoy making music the most are when all three are active and working together. Here are a few ways that I've learned to do this.

1. Before You Listen, Listen

When musicians speak of listening, it's usually *music* they're taking about. But what about the sounds and silences that exist *before* a note is even played? When I sit at the piano, I'll often first take some time to attune myself to the environment that I'm in. I notice the sounds that are usually ignored: air conditioning, birds, traffic, electronic hums, and more. This kind of aural meditation helps prepare me to be fully present and receptive to whatever happens next, whether it's listening to and interacting with other musicians, or going deeply into the interior in a solo piano context. Try it sometime and see how it feels for you. For further thoughts about listening in the more typical sense of the word, I highly recommend Ran Blake's book *Primacy of the Ear*.

2. Activate the Voice

First of all, *sing*. It doesn't matter whether you think you have a good voice. One of the best ways I've found to foster natural lyricism in improvisation is to play through the chord changes of a tune, trading phrases between my voice and my right hand. At first it may feel like each has its own rather distinct identity, but eventually they'll start to influence one another and merge. Also, practice singing the melodies to songs in your repertoire and notice how you phrase things. It's remarkable how much about pianistic melodic interpretation you can learn from your own emotional intuition.

3. Activate the Body

My piano teacher, Sophia Rosoff, is one the greatest teachers of music I've ever encountered, and she has shown me many useful techniques to help connect to the body and bring the rhythm to life. Here's one. Take a piece of music you're working on and isolate what the left hand and right hand are doing. Then tap out the rhythm of the left hand part with both feet together, while simultaneously tapping out the right hand part with both hands. Play the piece again. Usually it feels different immediately—less like you're trying to force the rhythm to happen, and more like joining a dance that's already underway.

4. Activate the Mind

The mind is most often running the show, and doesn't need nearly as much encouragement. There are a few things, however, that I've found to be helpful in engaging the mind usefully. My favorite, by far, is transposing. Learning a tune in multiple keys makes you experience the harmonic movements as something more than just "chord changes." It becomes less about knowing which notes are "allowed" in one chord or another, and more about understanding the shifting colors of the song and the relational aspects of harmony. You can also make up little games for yourself to find your way out of mechanical habits while improvising. For example, take a solo using intervals of minor/major seconds and minor/major sixths only. And try to make it sound like music, not math.

5. Surrender

All of the things described above can be thought of as ways of preparing yourself for making music. Once everything is activated, just *let go*. It's a paradoxical thing. Let go of thoughts about whether what you're playing is "old" or "new," "good" or "bad," "derivative" or "original." Just be present to what the music is, what it needs, and where it wants to go. It has a voice, body, and mind of its own.

Aaron Parks is a pianist and composer living in Brooklyn, NY. He has worked with acclaimed jazz artists like Terence Blanchard, Kurt Rosenwinkel, and Joshua Redman. His most recent recording *Arborescence* is out now on the ECM label. For more information visit aaronparks.com

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